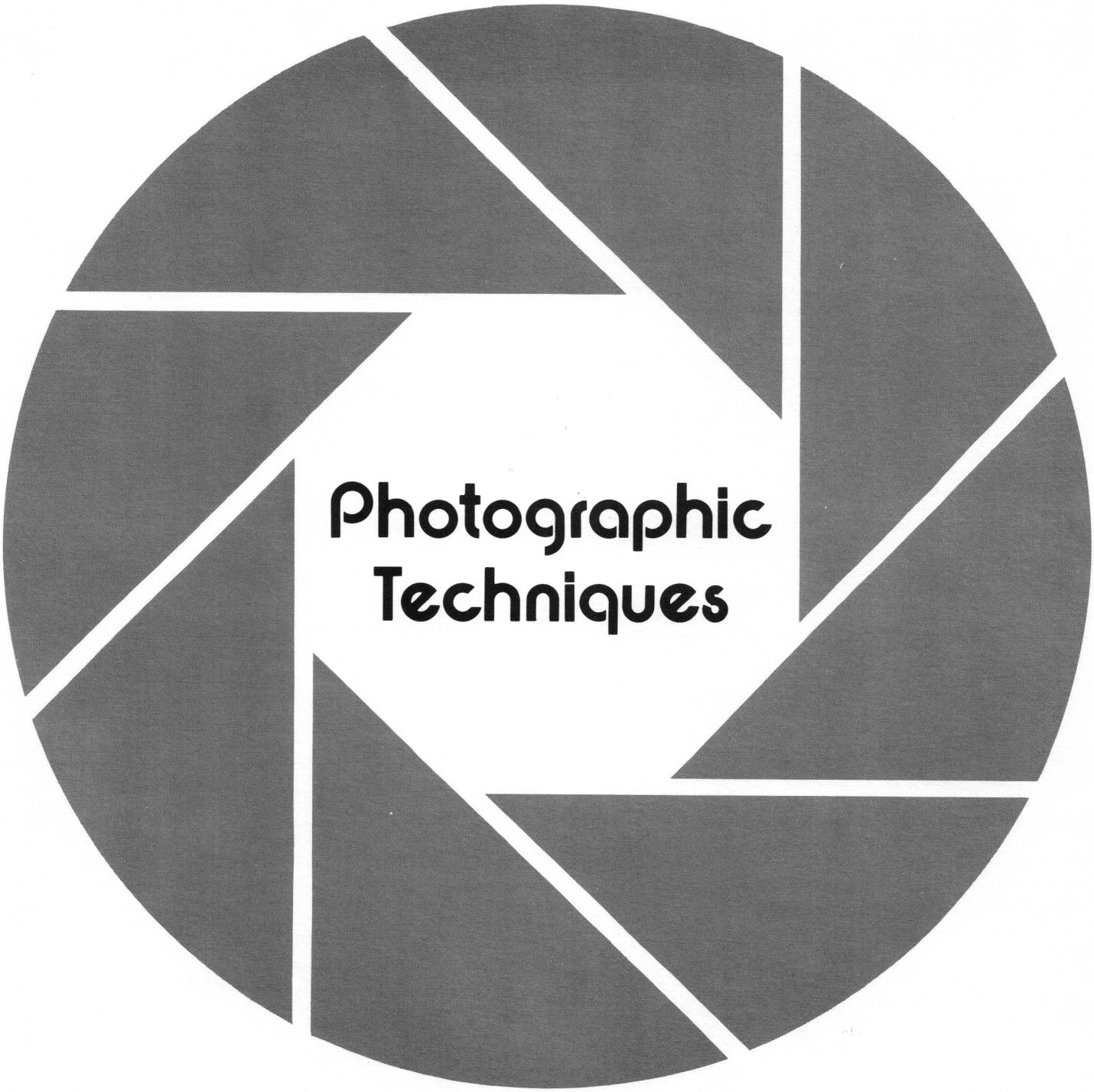
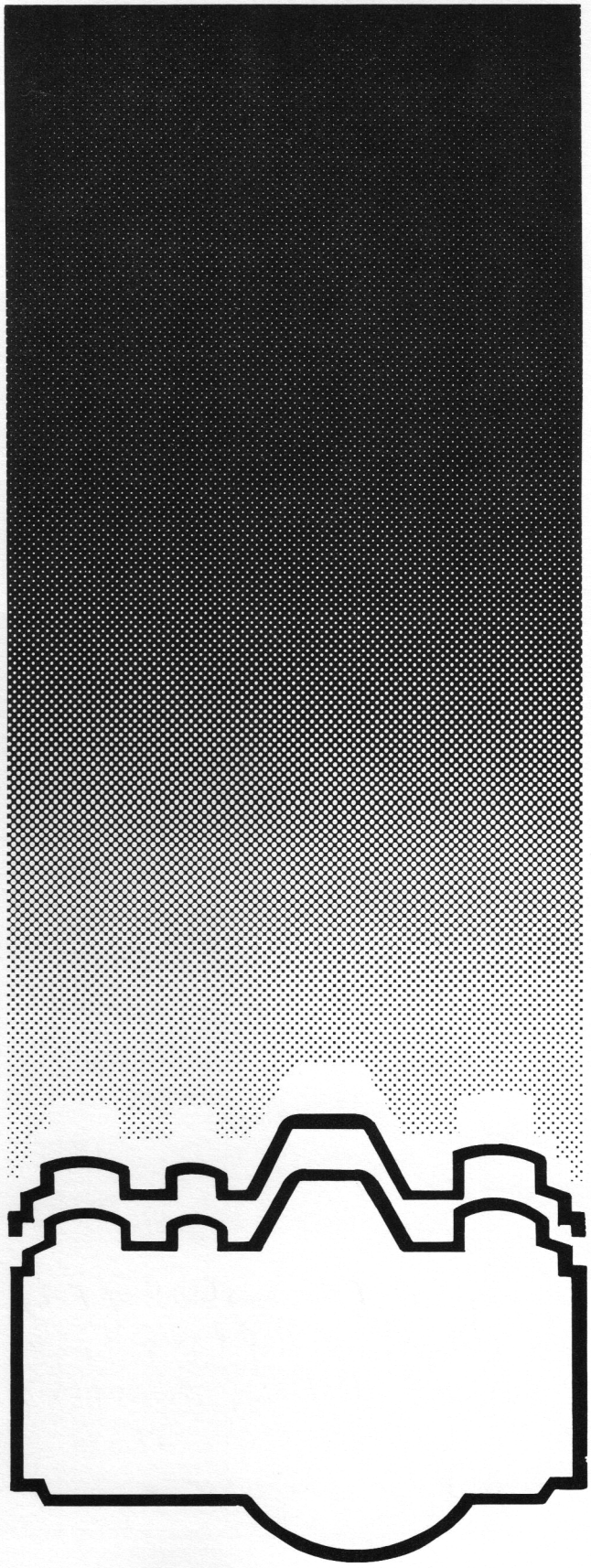

Photographic
Techniques



Author
Larry Lyells

Production Director
Bud Fowler

Art Production
Margaret Snyder

Advisory Committee
Jim Amos
Metro Camera Service

Doug Donaldson
Western Camera

Bill Glennon
Lindahl Camera

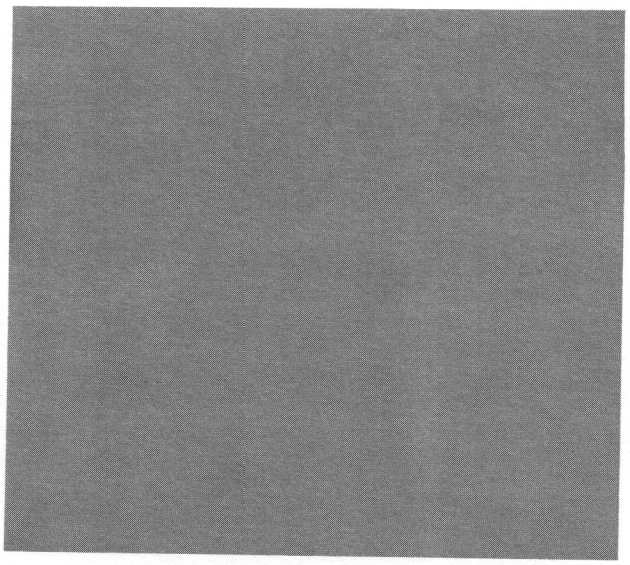
Mike Lowe
Rocky Mountain Camera Repair

Yoshio Arakawa
Pentax Corporation

contents

Photographic Techniques

1 PHOTOGRAPHY AND REPAIR
1 FILM AND THE LATENT IMAGE
3 COLOR TEMPERATURE
4 FILM SPEEDS
5 FOCAL-LENGTH CREATIVITY
6 THE CIRCLE OF CONFUSION
7 HYPERFOCAL DISTANCE
7 COMPOSITION
11 TYPES OF LIGHTING
16 FILTERS FOR B&W PHOTOGRAPHY
19 FILTER FACTORS AND SIZES
19 FILTERS FOR COLOR PHOTOGRAPHY
20 CONVERSION FILTERS
20 SPECIAL EFFECTS
21 Soft Focus
22 Vignetters
23 Star Filters and Diffraction Gratings
24 Other Special Effect Filters
24 Double Exposures
26 PORTRAITS
30 PORTRAIT LIGHTING
37 OUTDOOR LIGHTING FOR PORTRAITS
39 SUMMARY



1193

© Copyright 1983

National Camera, Inc.
Technical Training

1315 South Clarkson Denver, Colorado 80210

Photographic Techniques

PHOTOGRAPHY AND REPAIR

You've already covered the basic camera controls. In your lesson, "The Camera and Its Variations," you learned about the shutter-speed control, the diaphragm control, and the focusing control. Let's now look at some of the processes and techniques of photography.

Does a camera-repair technician then have to be a master photographer? Not at all. But you should have a strong enough photographic background to deal with your customers' problems.

In many cases, you'll find that it's the photographer—not the camera—causing the problem. You must therefore be able to distinguish between photographer error and camera error. Also, customers will seek your advice regarding different facets of photography. Your knowledge of professional techniques will gain respect from your customers.

FILM AND THE LATENT IMAGE

Film consists of a gelatin emulsion coated on a plastic base. The emulsion contains **silver halides**, the light-sensitive particles. When light strikes the silver halides, a chemical change takes place. That chemical change forms an image—the **latent image**.

You can't see the latent image. It takes another chemical process—development—to turn the latent image into a visible image. During development, the silver halides darken and clump together according to the amount of light they received during the exposure.



Figure 1A



Figure 1B

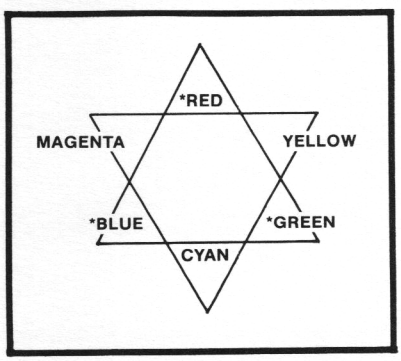


Figure 2 *Indicates primary colors

A black-and-white negative then interprets the colors of the scene as varying shades of gray. A light-colored area in the scene appears dark gray to black; a dark area in the scene appears light gray to transparent, Fig. 1. Printing the B&W negative restores the shades to their original brightness values. Light areas in the negative print as dark areas because they allow more light to pass.

Most B&W films respond to all colors of visible light—they just interpret those colors as varying shades of gray. B&W films that respond to all colors are called **panchromatic** films; you'll often see "pan" in the name of the film, such as Plus-X Pan. An **orthochromatic** film has a limited color response. It's sensitive to ultraviolet, violet, blue, and green light—but not to red light. On orthochromatic film, you can't distinguish between red objects and black objects.

If you're new to photography, you should probably use panchromatic B&W film as a learning tool. It's faster, easier, and less expensive to process and print in B&W. However, except for special applications, most people use color film. There are two basic types:

1. color-negative film
2. color-positive film.

The emulsions of color films also contain dyes. Just as the B&W negative reverses brightness values, the color negative reverses colors. The colors are **complementary** to (opposite to) those in the actual scene.

Magenta (reddish-purple) is the complement of green. A green color in the scene then records as magenta in the negative. Cyan (blue-green) is the complement of red. And yellow is the complement of blue. The color star, Fig. 2, shows the three primary colors and their complementary colors at a glance.

In the color star, the three primary colors appear opposite their complementary colors. The color star also shows what happens if you mix colors. If you mix red and green light, for example, you get what's in between—yellow. The color star shown in Fig. 2 refers only to colors of light; it doesn't hold true for mixing paints or water colors.

Printing the color negative once again reverses the colors. During printing, the processor can correct for a certain amount of error—both exposure error and color error. Color-negative film then has a fairly wide exposure **latitude**. "Latitude" refers to the amount of exposure error the film can tolerate while still allowing an acceptable print. How much latitude the film has depends on what you consider acceptable. A print from an underexposed (too light) negative may have soft or muddy colors; a print from an overexposed (too dark) negative normally appears harsh.

By comparison, color-positive film has a very narrow latitude. When you shoot color-positive film, you get transparencies (slides) which you view by transmitted light. The slide consists of the same piece of film used to make the exposure in the camera. All the colors appear normal (positive) rather than complementary (negative).

Since the original piece of film is also the finished product, there's very little room for error. Color-positive film may have a latitude of around 1/2 stop compared to perhaps two stops for color-negative films. An overexposed slide appears too light; an underexposed slide appears too dark.

A light slide (overexposed) projects better than does a dark slide (underexposed). Therefore, some technicians adjust automatic cameras to provide a slight overexposure; they then depend on the latitude of color-negative films to handle the error. But with color-negative films, a slight underexposure may be better than a slight overexposure—the processor can more easily correct the color imbalance that results from underexposure. Since most people shoot color-negative film, it's probably safer to accept a slight error on the underexposure side.

COLOR TEMPERATURE

Color films are also classified according to their color sensitivity—or **color temperature**. Color temperature describes the sensitivity of the emulsion to different colors. The color temperature is measured in **degrees Kelvin** (or just Kelvin). Kelvin refers to a temperature scale similar to Celsius. But it's based on a zero of approximately –273°C.

A standards committee arrives at the color temperature by heating a **blackbody radiator**—a black metal object. At first, the radiator emits only heat (infrared). However, as the temperature increases, the radiator starts emitting visible light.

At a low heating temperature, the light appears dull red—a low color temperature. Then, as the temperature rises, the appearance of the metal changes. It goes through orange to yellowish white.

The higher the temperature, the more blue light the radiator emits. Blue thus corresponds to a high color temperature, and red corresponds to a low color temperature. Outdoors, where the light comes from the sun, there's a lot of blue—a high color temperature. The color temperature reaches around 6000K (degrees Kelvin) during the day. As the sun sets, however, reds start to take over.

Indoors, where artificial light provides the illumination, there's a low color temperature. The light contains more red and less blue. An incandescent lamp provides a color temperature of around 2685K.

No color film can provide proper color balance under such a wide range of color temperatures. That's why manufacturers balance films for different lighting conditions. Daylight-type films provide proper color balance outdoors and with electronic flash.

However, since the color temperature varies during the day, you'll see differences in color rendition. In the morning, your pictures may appear bluish because of the high color temperature. And in the evening, as the sun starts to set, your pictures take on a warm appearance with reddish-orange colors.

What happens if you expose daylight-type film under artificial lighting? Unless you're using electronic flash, you again get the reddish-orange colors. A person's face, for example, may appear as though it were illuminated by a campfire. The reddish-orange colors give a feeling of warmth, often effective for certain types of pictures.

To get proper color balance, you can use a film balanced for the particular type of light. A photoflood has a color temperature of 3400K. So, if you're using photofloods for

illumination, you can select a film rated at 3400K (Type A film). With tungsten lamps, use a film rated at 3200K.

Outdoors, though, the artificial-light films will give you cold colors—heavy on the blues. Cold colors can give the feeling of tranquility. Although bluish colors may be effective for certain types of pictures, they're generally not desirable for pictures of people. A person with bluish flesh tones looks more sickly than tranquil.

ASA	DIN
25	15
64	19
80	20
125	22
160	23
200	24
250	25
320	26
400	27
500	28
650	29
800	30
1000	31

Figure 3

FILM SPEEDS

Your lesson on optics describes the relationship of the film speed (speed value) to the other exposure variables. The speed value, as you've learned, is a number that indicates the sensitivity of the film to light. A faster film requires less light for proper exposure.

At one time, films were rated either in ASA values or in DIN values. The American National Standards Institute (ANSI) assigns the ASA film speeds. "ASA" stems from earlier days when ANSI called itself the American Standards Association. But, since camera film-speed dials have ASA calibrations, ANSI didn't apply its name change to film ratings. DIN stands for "Deutsche Industrie Norm," the German standards institute. Fig. 3 shows how ASA ratings compare with DIN ratings.

Now most film manufacturers use the international unit—ISO (International Standards Organization). The ISO rating includes both the ASA value and the DIN value. For example, 35mm Tri-X Pan has an ASA rating of 400 and a DIN rating of 27. The ISO rating is ISO 400/27°.

Tri-X Pan is a relatively fast B&W film. The fast film speed makes Tri-X a good choice for low-light conditions. Tri-X Pan Professional, available in 120 size, has a slightly slower film speed—ASA 320. Many photographers consider Tri-X Pan Professional to be the ideal B&W film for portraiture. The film's slight oversensitivity to red often eliminates the need for retouching.



Figure 4 **Grain causes the apparent lack of sharpness in this enlargement.**

But there's a sacrifice with the faster films. The faster the film, the more pronounced the effects of **grain**. Grain refers to the clumping together of silver particles. The grain creates a granular effect, Fig. 4, which makes the image appear less sharp.

As you enlarge the print, the grain effect becomes more apparent. Why? Because the grain gets magnified along with the image. With larger film formats, grain doesn't cause as much of a problem. A 2-1/4 negative doesn't have to be enlarged as much as a 35mm negative for the same size print.

So, if you plan on making a large print, you might select a slower film. Plus-X Pan, with a film speed of ASA 125, makes a good general-purpose film—a compromise between grain and sensitivity. Panatomic-X, rated ASA 32, provides even finer (less noticeable) grain.

Perhaps the champion of the 35mm fine-grain films, though, is Kodak's Technical Pan. Rated as ASA 25, Technical Pan can be enlarged many times without evidence of grain. The prints then appear very sharp. But Technical Pan does require a special developer which we'll cover in the next assignment.

Not everyone considers grain objectionable. Photographers often shoot for intentional grain to achieve a special effect. One technique involves pushing the film. Here, you intentionally underexpose the film. For example, you might

shoot a film rated ASA 100 at ASA 400. You then increase the development time by a comparable amount to build up the density and the grain. Some film processors will push the film according to your directions, but they usually charge extra for such "custom" service.

Color films generally have slower film speeds than B&W films. But you can get high-speed color-negative films rated at ASA 400. A fast color-positive film, like High-Speed Ektachrome, has only an ASA 160 rating.

So what film speed should you select? If you like sharp images, you should probably use the slowest film that'll do the job; don't buy sensitivity you aren't going to need.

The film speed also plays a part when you're adjusting automatic cameras. If you know your customer always uses ASA 400 film, for example, you might make your adjustments at ASA 400. However, you'll normally make your adjustments at ASA 100. That's the standard most camera manufacturers use.

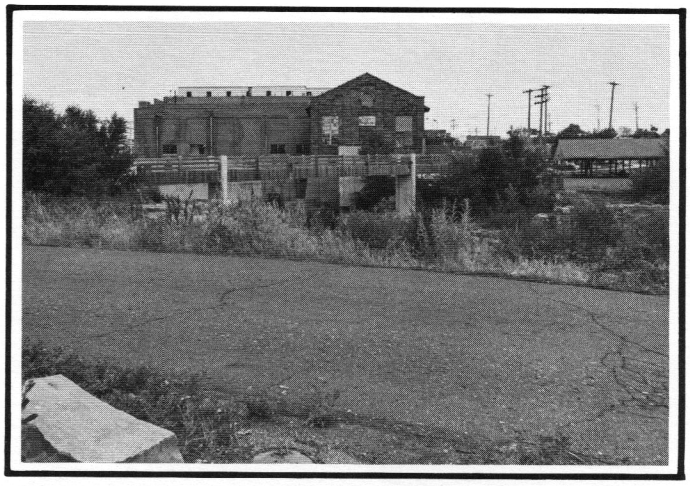


Figure 5 **Wide-angle perspective**

FOCAL-LENGTH CREATIVITY

In your optics lesson, you learned the main reason for changing the focal length of the lens—to change the size of the image. But the focal length of the lens also provides a control of depth of field and perspective.

Perspective refers to the apparent dimension in the print. Although the print has only two dimensions, it may appear to have depth. Or, with a compressed perspective, objects at different distances appear to be on the same plane.

Actually, the shooting distance—not the focal length—determines the perspective. But you can use the focal length to control the shooting distance. For example, Fig. 5 shows a scene shot with a wide-angle lens. Fig. 6 shows the same scene shot from the same distance. For Fig. 6, we used a telephoto lens.

In the wide-angle shot, the relative sizes of the picture elements provide an apparent depth. For example, there appears to be some distance between the bridge and the building. The telephoto shot, however, compresses the perspective. Notice that the bridge and the building appear to be on the same plane.

Yet suppose that we moved back to take the telephoto shot—far enough to include as much in the picture as we have in Fig. 5. The perspective for both shots would then be the same. Making the image larger—either by moving closer or by using a longer lens—tends to compress the perspective.

The term **telephoto perspective** refers to the compressed perspective. And **wide-angle perspective** refers to the apparent dimension in a photograph. Wide-angle perspective can also cause **wide-angle distortion**. Objects closer to the camera appear larger, out of proportion to the rest of the subject.

Perhaps you're using a wide-angle lens to shoot a picture of a person. If the person's hand is too close to the camera, it appears disproportionately large. Or, if you're shooting a head-and-shoulders portrait, you may give your subject an extra-large nose or ear.

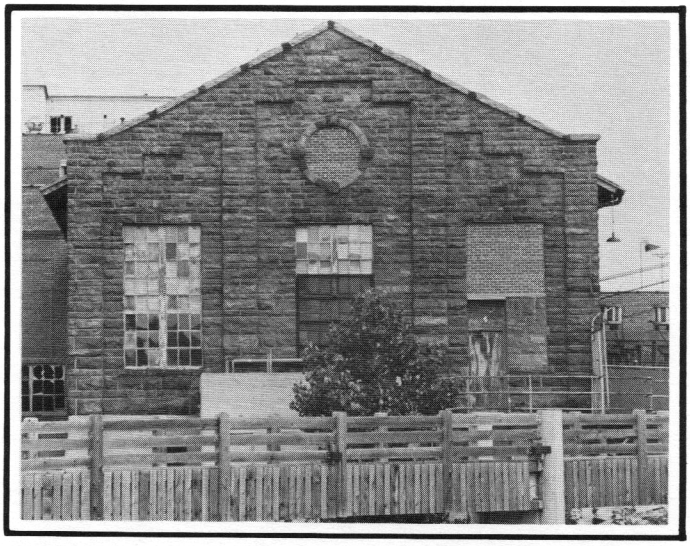


Figure 6 **Telephoto perspective**

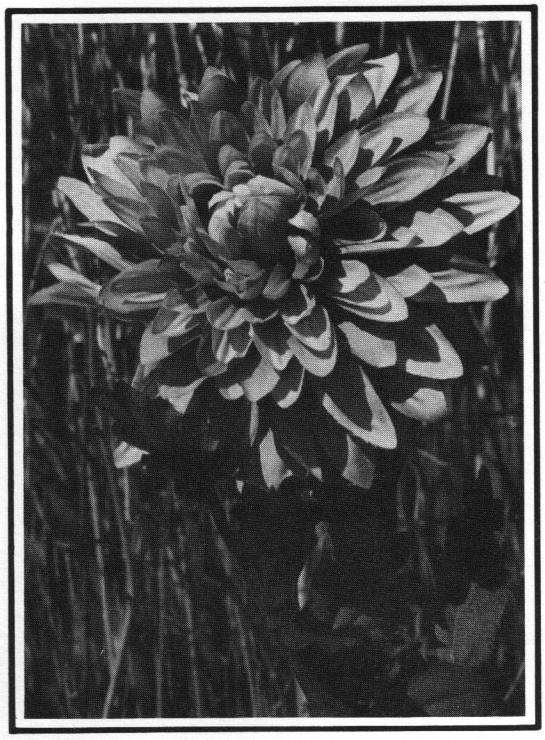


Figure 7
At f/16, the detail in the background—although out of focus—is distracting.



Figure 8
At f/2.8, the background goes so far out of focus that it becomes a soft blur.

Again, the distortion results from the shooting distance—not from the focal length. You could get proper perspective with the same lens by moving back to take the picture. However, the picture may then contain more than you actually want.

For portraits, most photographers use medium-telephoto lenses—around 80 to 135mm in a 35mm format and around 150mm to 250mm in a medium format. That way, they can shoot at a distance that eliminates distortion while still filling the frame with the subject.

Yet you can use a shorter lens for pictures of people—just keep all parts of the person's body on nearly the same plane. If a hand or foot strays too far from the rest of the body, it will appear too large in the picture. For a head-and-shoulders portrait, move back far enough to include around 3/4 of the person's body. Then, when making the print, crop the picture the way you want it.

Similarly, the shooting distance affects depth of field. In "The Camera and Its Variations," you learned how the f/stop controls depth of sharpness. The shooting distance provides another control.

Whenever you make the image larger, the depth of field suffers. That's true whether you make the image larger by moving closer to the subject or by using a longer focal length. A wide-angle lens provides very good depth of field; notice in Fig. 5 that all the picture elements are acceptably sharp. But the telephoto lens provides a very limited depth of field.

Depth of field becomes severely limited at very close shooting distances. When you're shooting close-ups, only those picture elements on the same plane as the subject may be acceptably sharp. Yet the limited depth of field can also be an advantage—it allows selective focus. With selective focus, only your subject appears sharp. The subject then stands out.

If you want all elements in a close-up to be acceptably sharp, try to keep them on nearly the same plane. And use a small f/stop. Also, focus on the picture elements that are closer to the camera. Why? Because your back depth of field is greater than your front depth of field. Objects behind your focus point will appear sharp for a greater distance than will objects in front of your focus point.

THE CIRCLE OF CONFUSION

Many factors contribute to the apparent sharpness of a picture. To the viewer, the sharpness is subjective. The picture either looks sharp or it doesn't. Or one picture looks sharper than another. But to define sharpness from an objective standpoint, you need a standard.

That's where the term "circle of confusion" comes in. Consider that you're photographing a point source of light—maybe a star. If the point source photographs as a point, you have maximum sharpness. However, you don't really get a point on the negative—you get a circle.

Any image then consists of a series of overlapping circles—the "circles of confusion." The smaller the circles, the greater the apparent sharpness.

The diameter of the circle of confusion now provides a method of defining sharpness. If the diameter stays within a

certain limit, the image appears sharp. The image doesn't appear sharp when the diameter exceeds that limit.

How big can the circle of confusion be? That depends on the negative size. Normally, you enlarge a small negative more than a large negative. The circle of confusion should therefore be smaller with a small negative.

With a 2-1/4" negative, the circle of confusion should be 1/1000 or less the focal length of a normal lens. The normal lens for this negative size is generally 80mm. The diameter of the circle of confusion should then be 0.08mm or smaller.

The circle of confusion for a 35mm negative should be less than 1/1500 the focal length of the normal lens. 1/1500 of 50mm equals 0.033mm. As you work on precision cameras, you can see why tolerances become even tighter and more critical in the smaller formats—simply because the negative must be enlarged a greater amount.

HYPERFOCAL DISTANCE

Focusing the lens takes time—enough time that you could miss a "grab" shot. Even the autofocus cameras require quite a bit of time to move the lens to the proper focus position. But the fixed-focus lens is always ready for that unexpected or fast-moving picture.

A fixed-focus lens is set at the hyperfocal distance. The hyperfocal distance is the distance from the camera at which acceptable focus begins. Thanks to the depth of field, all subjects within a certain distance range remain acceptably sharp.

You can also use the hyperfocal distance to preset your full-focusing lens. That way, you're always prepared for an unexpected snapshot. First determine the exposure for the lighting conditions. Select the smallest f/stop you can use for maximum depth of field. And use a fast enough shutter speed to stop the action.

Perhaps the lighting conditions call for f/8 at 1/125 second. Unless the lighting conditions change completely, you can leave your camera at these settings. The hyperfocal distance now depends on the f/stop—f/8 in our example.

Next set the focusing ring to a preset distance. Most fixed-focus lenses are set for 15-20 feet. But rather than using the normal focusing-scale index, use the depth-of-field scale—set your maximum focusing distance next to the f/stop calibration on the depth-of-field scale, Fig. 9.

In Fig. 9, we've set the "15" calibration on the focusing ring next to the "8" depth-of-field calibration—f/8 at 15 feet. The acceptable focus now extends from the "8" on one side of the depth-of-field scale to the "8" on the other side. Subjects within the range of 8 to 15 feet are then acceptably sharp.

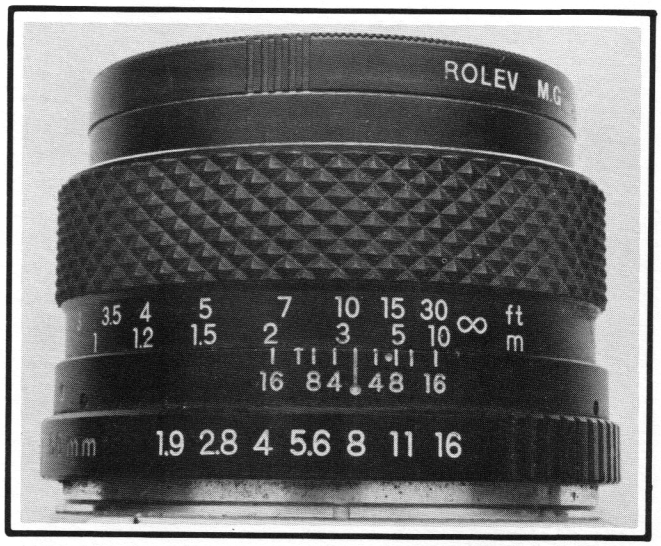


Figure 9

COMPOSITION

Composition refers to the selection and arrangement of the items making up your picture. You want to communicate the picture's meaning as effectively as possible. There should be a reason behind every picture—a story to tell, a fact to report, a mood or emotion to bring. Emphasize the elements which aid in getting across your idea; subordinate or discard those elements which distract and confuse.



Figure 10

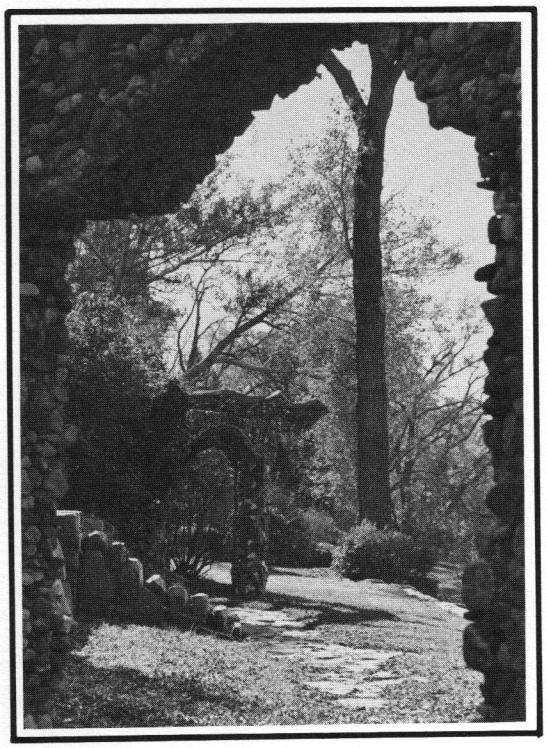


Figure 11
Almost anything can work as a foreground frame. Here, one gazebo provides the frame for a neighboring gazebo.

The "rules of composition" offer guidelines for improving most types of pictures. Photographers often break the rules for special effects. But following the rules can provide a safeguard for good pictures as well as a learning tool.

There's one rule that's practically ironclad—every picture should have a **center of interest**. The center of interest is what holds and attracts the viewer's attention. Generally, a picture should have just one center of interest. More than one pulls the viewer's attention in different directions.

Select the element in the scene that you consider most important—the reason behind your picture. Make that element your center of interest. Subordinate the other elements of the picture. Or use them to call attention to your center of interest.

Here's one way to assign importance to your center of interest: give it the attention-grabbing position in the frame. A picture element that's closer to the camera takes on more importance than the other elements. Similarly, a picture element that's higher in the frame catches the viewer's eye more quickly.

For example, the bride provides the center of interest in Fig. 10. For one thing, she's closer to the camera. And, even though the groom is higher in the frame, he's been subordinated by selective focus. Since the groom is looking at the bride, he helps direct the viewer's attention to the center of interest.

What if you want to give both people equal importance? You can then place one person closer to the camera and the other person higher in the frame. Both people should be in equally sharp focus. And both should be looking in the same direction or at each other.

In a scenic, you may not be able to position your picture elements. But you can choose your camera position. One of the best ways to emphasize your center of interest is to use a **foreground frame**. Place something—perhaps a tree limb, a fence post, etc.—in the foreground. If you position the foreground frame at the top of the picture, you help draw down the viewer's eye. Putting the foreground frame at the side of the picture helps direct the viewer's eye to the center.

The foreground frame also gives dimension and scope to scenics. If the foreground frame is close to the camera position, the viewer can relate to the coverage of the picture. Using foreground frames thereby gives depth—a three-dimensional appearance—to your scenics, Fig. 11.

Including people in your scenics also gives perspective and adds interest, Fig. 12. The viewer can relate the sizes of the people to the scope of the scene. But, to keep the picture a scenic, don't let the people dominate. Keep the people small, and have them look at the scene—not at the camera.

Here are some of the other general rules that can often improve the picture's effectiveness:

1. Avoid dividing a picture evenly.

A picture that's divided into two equal sections appears static. In a scenic, don't let the horizontal line formed by the horizon evenly divide the picture. Rather, raise the camera to put more emphasis on the sky, Fig. 12. Or lower the camera to put more emphasis on the foreground. Either way, moving the dividing line off-center adds life to the scenic.

Similarly, avoid centering your subject. Placing your center of interest off-center provides more life. A centered subject often gives a static appearance. If your subject is a person, avoid putting the head in the center of the frame.



Figure 12

2. Give people room in which to look and moving objects room in which to move.

Fig. 13 shows an example. Here, we've left more room to the front of the running subject. If we had left the open space at the other side, it would appear that the little girl is about to run into the edge of the frame.

In a portrait, leave more room in the direction in which your subject is looking. What if you don't leave this room? The subject then appears cramped for space.



Figure 13

3. Paths, roads, rivers, etc., should lead into the picture rather than out of it.

A path leading into the picture, Fig. 14, tends to lead your eye into the picture. But if the path runs out of the picture, your eye tends to follow the path—right to the edge of the picture. The same holds true for rivers and similar picture elements.

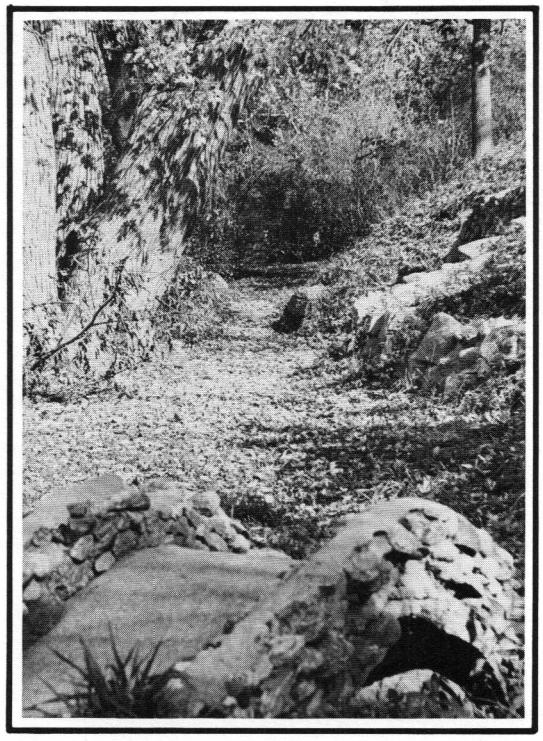


Figure 14

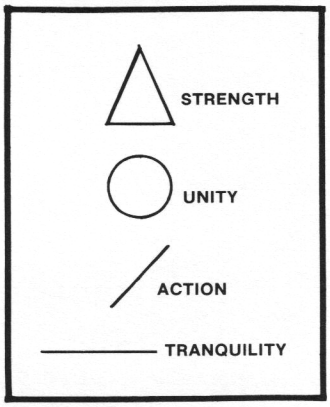


Figure 15

4. Use natural circles, triangles, diagonal lines, and horizontal lines to strengthen the mood of the photograph.

Natural shapes formed by your picture elements can give mood and purpose to the photo, Fig. 15. A triangle gives strength to the composition. By arranging your picture elements in a triangular composition—a wide base, narrowing toward the top of the frame—you get across the feeling of strength. Fig. 16 shows a family group arranged in a triangular composition.

A circle gives the feeling of unity. The circular composition then provides another natural for family groups, Fig. 17.

Also look for the diagonal line. A diagonal line gives the feeling of action—like a runner straining for the finish line. You can find diagonal lines just about anywhere. In a scenic, a diagonal tree branch or trunk can add more life to an otherwise static scene. Or, with pictures of people, you might form diagonal lines with the arms or legs.

By contrast, the horizontal line implies peace and calm—like a person lying on his back. In a scenic, the dividing line between the sky and ground forms a horizontal line. A dominating horizontal line can give a static, lifeless feeling to your picture. So, unless you're after a tranquil mood, you should generally avoid the horizontal line.

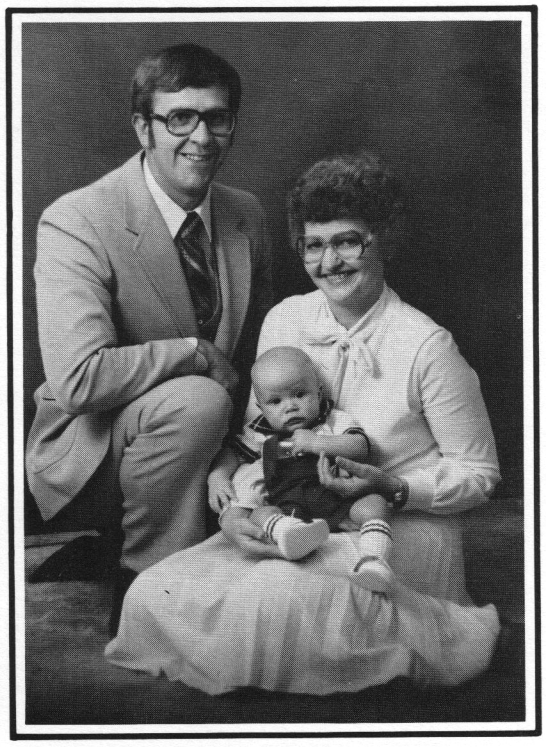


Figure 16 A triangular group arrangement



Figure 17 A circular group arrangement

TYPES OF LIGHTING

The lighting with which we're most familiar is sunlight. Because there's only one sun, we're accustomed to seeing things illuminated by a single light source. Even the most sophisticated studio lighting setups try to duplicate the effects of sunlight.

If you're shooting outdoors, you have no control over the position of the sun. But, in most situations, you can control the position of the subject and/or the camera. Plus you can usually choose the time of day for shooting.

A bright, sunny day gives you the brightest colors on color film. On an overcast day, the shadows are softer. Your pictures take on a soft, subdued look. Also, the time of day makes quite a difference. In the early morning, you get cool pastels. The evening provides warmer colors.

You have another lighting control by "positioning the sun"—controlling the angle at which the sunlight strikes your subject. At one time, photographers followed the rule, "shoot with the sun behind your back." If you're shooting pictures of people, however, frontlighting causes a problem—your subjects must squint into the sun. Outdoor pictures of people, as well as pictures of other subjects, can often be improved by letting the sunlight strike at an angle.

Suppose, for example, that you're photographing an old building. Frontlighting tends to fill in the surface texture. You then lose much of the character that makes the old building interesting.

Try changing your shooting position so the sun strikes the building at an angle. The resulting shadows give dimension and texture to your subject. We can illustrate the effects of the light direction with the gingerbread house, Fig. 18.

Fig. 18 shows the effect of frontlighting. In Fig. 19, we've moved the light to a 45° angle. Notice that the shadows increase the dimensional effect (an effect photographers refer to as "modeling"). The shadows on the roof allow you to see the texture.

Moving the light to a 90° angle really emphasizes the texture, Fig. 20—so much so that 90° sidelighting is often called "texture lighting." The light skims across the surface, emphasizing the detail.



Figure 18 **Frontlighting**

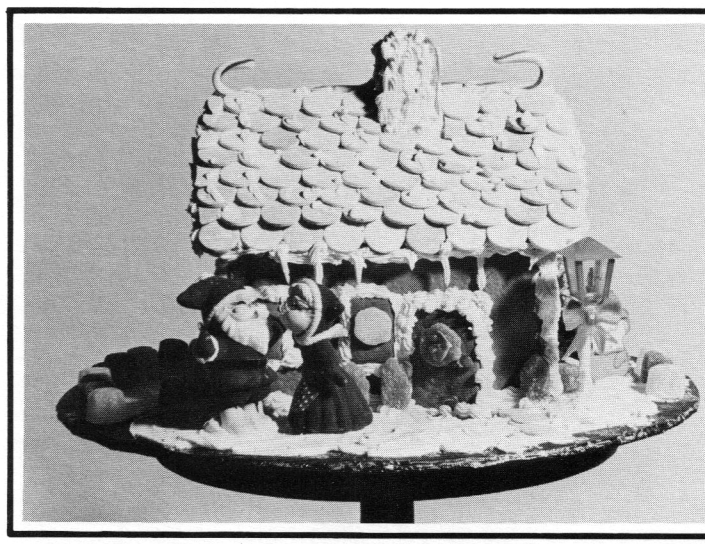


Figure 19 **45° sidelighting**



Figure 20 **90° sidelighting**

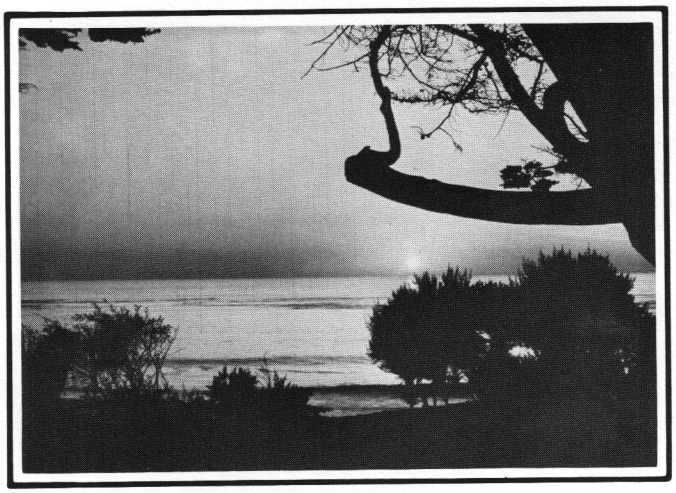


Figure 21 **You can add interest to sunsets by putting something recognizable in the foreground. To make your foreground subject a silhouette, expose for the sky.**

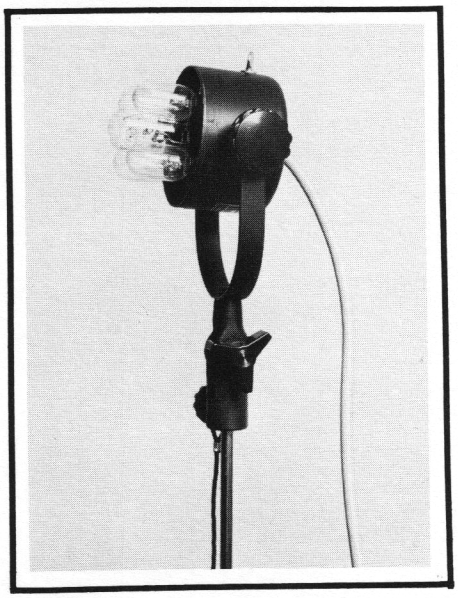


Figure 22

A studio electronic-flash unit. The center lamp is the flashtube; the other four lamps are the modeling lights.

Backlighting also produces interesting effects. Shoot into the sun with the subject between the sun and the camera. The backlighting often rings the subject with light. If your subject is a person, the backlighting adds strong highlights to the hair.

Your exposure with backlighting depends on how much detail you want. If you expose for the sunlight, your subject becomes a silhouette, Fig. 21. A silhouetted foreground as in Fig. 21 adds depth and interest to sunsets.

If you expose for your subject, you'll burn up the sky. Or, if you want detail both in the sky and the foreground, you might take separate readings—one for the sky and one for the foreground. Compromise between the two readings for your overall exposure.

In any unusual lighting conditions, though, it's safest to **bracket** your exposures. Shoot at least one stop over and one stop under your meter reading. If the meter says to use f/11, you might shoot three pictures—one at f/11, one at f/8, and one at f/16.

Indoors, you have even more control over the lighting. There are three basic types of indoor lighting:

1. available light
2. floodlights (photofloods)
3. electronic flash

As films became faster, the popularity of available-light photography increased. Here, you add no supplementary lighting—you just use whatever light happens to be available in the setting. Available light gives you natural and often beautiful effects. Plus, unburdened by some type of lighting accessory, you have complete freedom.

Available light from a window provides very soft and natural illumination—especially for portraits. The closer you place your subject to the window, the softer the light. Moving your subject further from the window gives more direction to the light, adding dimension to the photograph. Ideally, the window should have either a north or south exposure. If the window faces east or west, the sun may directly illuminate your subject. You then lose some of the softness of window lighting.

Floodlights and electronic-flash units are the most popular types of artificial lighting. Since the floodlight provides a continuous light source, it has one advantage—you can see in advance the exact lighting effects. But the light becomes hot and uncomfortable. Also, because of its bulk, the floodlight is usually restricted to studio use.

Yet even in the studio, the electronic-flash unit has just about replaced the floodlight. Electronic flash provides a brief, intense burst of light that matches the color sensitivity of daylight-type film. There's practically no heat to make working conditions uncomfortable.

Studio electronic-flash units have **modeling lights**—tungsten or quartz lamps that show you in advance where the flash shadows will fall, Fig. 22. But with other electronic-flash units, you must visualize the lighting effects in advance. The position of the flash unit relative to your subject makes quite a difference in the effect.

Most people mount the electronic-flash unit to the camera—either on the accessory shoe or on a bracket to one side of the lens. On-camera flash produces safe lighting; you get even flash coverage without harsh shadows. But the lighting is flat and dimensionless.

On-camera flash may also produce pinkeye. If you're shooting pictures of people in a fairly dark area, the pupils of your subjects' eyes may appear red or pink. The color comes from the flash bouncing off the retinas of the eyes.

Separating the flash from the lens usually eliminates pinkeye. If you hold the flash high and to one side of the camera, the light strikes the subject at an angle. Now you get dimensional shadows that model (give dimension to) the subject. Besides eliminating pinkeye, the flash angle can also eliminate reflections from eyeglasses.

Remember that the flash should always strike the subject from above—not from below. Why? Again, we're accustomed to viewing things by sunlight. The sun produces shadows that fall downward across the subject's face. If the flash strikes the subject from below, the shadows fall up. The resulting modeling appears unnatural—even frightening. You'll see this type of lighting used in horror movies to make the monster look even more bizarre.

With a single flash, though, the angle of the illumination can cause other problems. For one, there may be too little detail in the shadow side of the face. Harsh shadows on one side of the face can give a dramatic effect, but they generally aren't complimentary to the subject. Also, unless you can provide quite a bit of separation between your subject and the wall, you'll get unattractive background shadows.

Perhaps the ideal compromise position for the flash unit is above and in line with the lens—high frontlighting, Fig. 23. The background shadows now fall directly behind the subject, hidden from the camera. High frontlighting also produces attractive modeling to the subject's face.

If you're photographing a group of people, you can again choose high frontlighting. Aim the flash at the center of the group, letting the spill light from the flash illuminate the ends of the group. If you've arranged the group in rows, direct the flash to the back row. The spill light then illuminates the people in front.

Another alternative to get even, almost shadowless lighting is to use bounce flash. With bounce flash, you direct the flash at a wall or ceiling. The reflected light then illuminates your subject. In effect, you're increasing the size of the light source—the entire wall or ceiling becomes the source of light. The larger the light source, the softer the lighting.

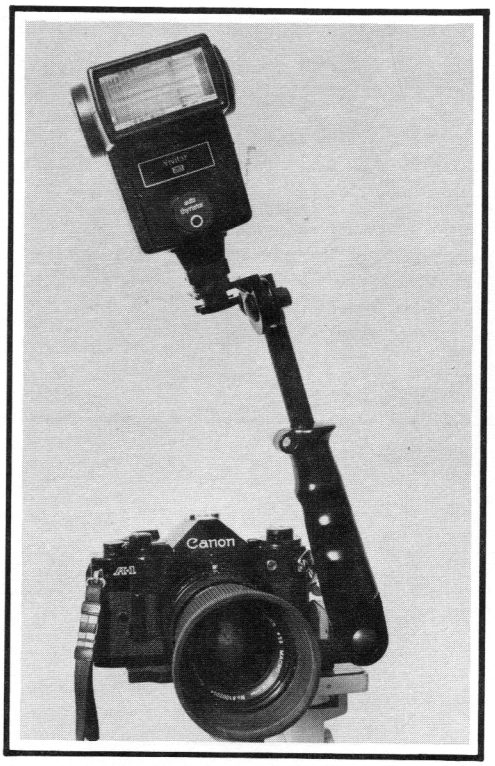


Figure 23

With direct flash, set your f/stop according to the flash output, the subject distance, and the film speed. A calculator on the flash unit allows you to quickly determine the proper f/stop.

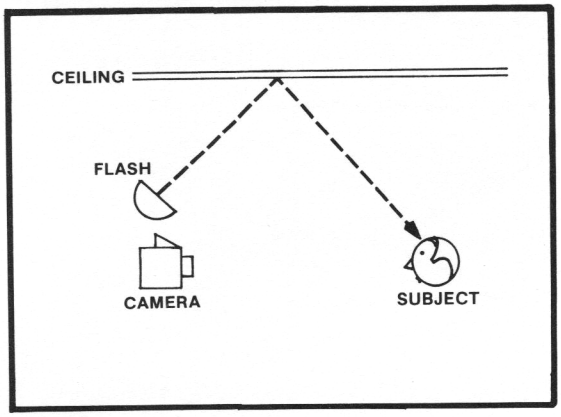


Figure 24

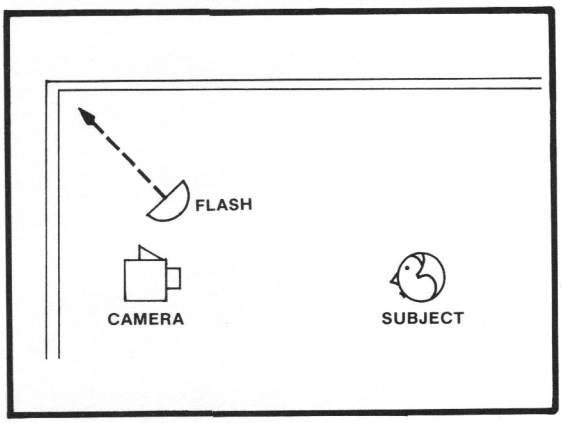


Figure 25

For bounce-flash portraits, be careful that you don't bounce the flash directly over the subject's head, Fig. 24. Direct overhead lighting causes dark eye sockets or shadows under the eyes. If possible, try to bounce the flash from the corner formed between the wall and the ceiling, Fig. 25. You then get front-lighting as well as overhead lighting; the frontlighting fills in the eye sockets. If you can only use the ceiling, bounce the flash above the camera rather than above the subject.

Bounce flash does require an increase in exposure. Not all of the reflected light returns to the subject; the ceiling absorbs some of the light. The amount of light loss depends on the color of the ceiling, the height of the ceiling, and the distance between the flash and the ceiling.

With a low, white ceiling, you may only have to open up the lens one or two stops. Dark-colored and high ceilings require a larger compensation. It's best to bracket your exposures. Some automatic flash units allow you to tilt the head for bounce lighting, Fig. 26. The sensor that shuts off the flash still faces the subject, providing automatic compensation for the light loss.

Also, if you're shooting color film, the ceiling should be white. If the ceiling is green, for example, you'll be illuminating your subject with green light. A person in the picture then has green flesh tones.

Bounce flash works especially well for subjects which might be burned up by direct flash. For example, it's sometimes difficult to get detail in a white-on-white subject—perhaps a white cake with white decorations. Direct flash tends to burn up such subjects; everything becomes a solid white with no detail. The soft light from bounce flash, however, often shows the separation with white-on-white subjects.



Figure 26

The sensor (thyristor) at the front of the automatic unit cuts off the flash when the subject has received the proper amount of light. Many units allow you to change the sensitivy of the sensor; you then have a choice of f/stops.

But bounce flash may be too nondirectional for portraits. Nondirectional lighting fills in all the shadows and eliminates modeling. You can improve bounce-flash portraits by taping a piece of white cardboard to the head of the flash, Fig. 27. Some of the light then reflects from the cardboard directly to the subject's face—a smaller light source to provide some modeling. The light reflected from the cardboard also fills in shadows under the eyes.

The advantages of bounce flash led to the photographic **umbrella**, Fig. 28. By bouncing the flash off the umbrella, you get a large light source for soft illumination. Yet you can still position the umbrella to provide directional lighting. The larger the umbrella—and the closer the umbrella to your subject—the softer the light.

Some umbrellas, like the one shown in Fig. 28, have silverized reflecting surfaces. The silver surface reflects almost all of the light, resulting in very little light loss. You may only need around 1/2 stop exposure compensation. Another type of umbrella is made of white cloth. The cloth umbrellas give even softer lighting than do the silver umbrellas. But there's a greater light loss.

When you're using electronic flash, your shutter speed plays no part in the flash exposure—the brief burst of light from electronic flash is faster than any speed the shutter can deliver. Yet you can often use your shutter-speed setting as a creative control. The shutter-speed setting may determine whether or not the available light has anything to say about the picture.

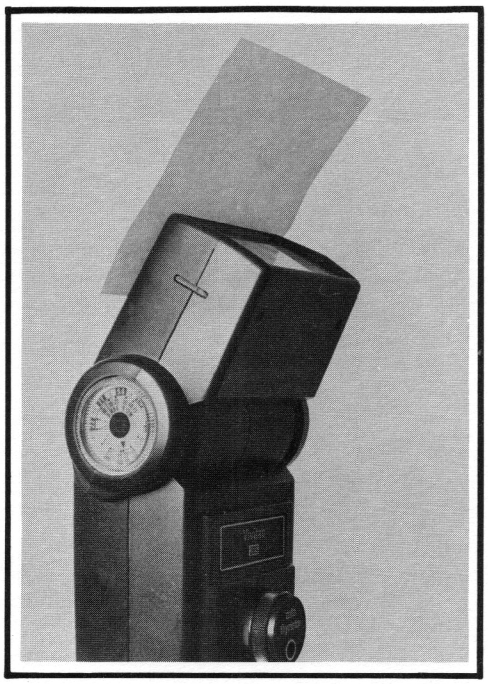


Figure 27

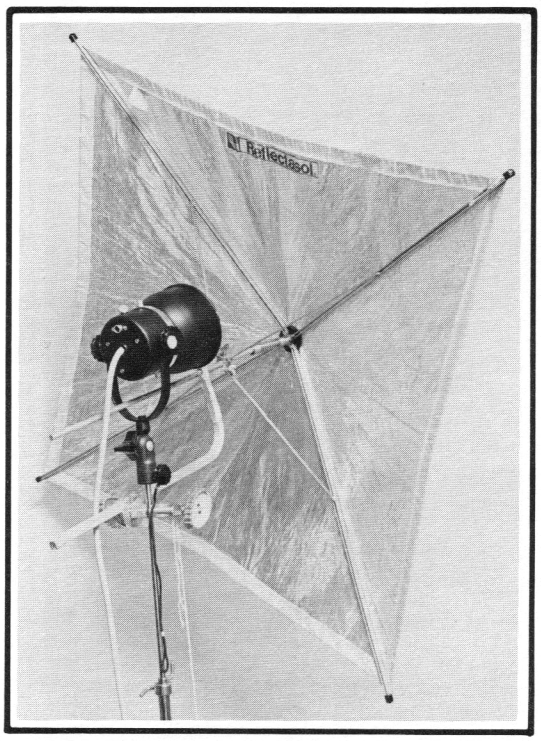


Figure 28

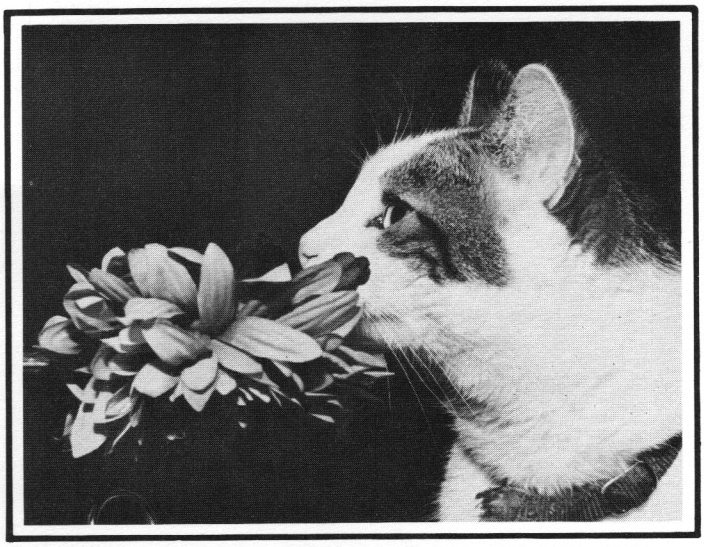


Figure 29 **An electronic-flash unit exposed the subject, and the fast shutter speed prevented available-light exposure to the background.**

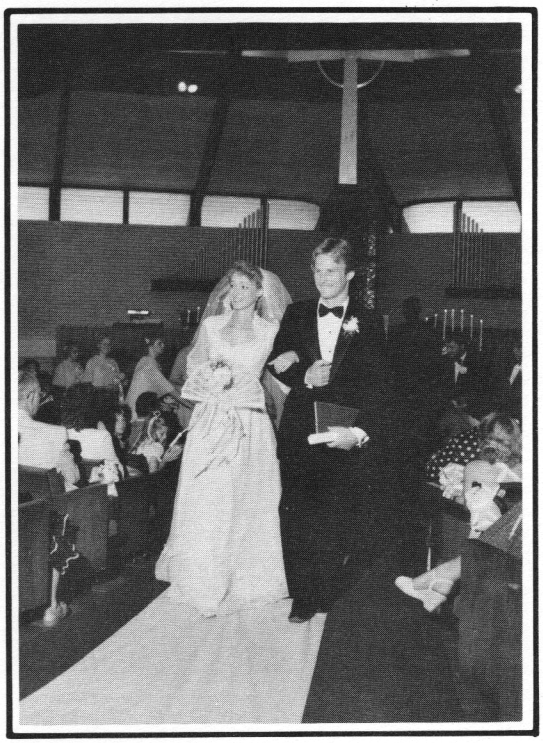


Figure 30

Using a slow shutter speed with electronic flash allowed the available-light exposure in the background.

The electronic flash covers only a short distance and a fairly narrow angle. Consequently, areas outside the flash coverage must rely on available light. If you use a fairly fast shutter speed, your subject receives proper flash exposure. But the underexposure to the rest of the scene gives you a black or dark background, Fig. 29. In some situations, you may want that black background to make your subject stand out.

But in other situations, you might want some detail outside the flash coverage. Perhaps you're shooting the bride and groom coming down the aisle after the wedding ceremony. If you use a fast shutter speed, your picture may show only the bride and groom—the church interior records as a solid black.

By using a slower shutter speed, perhaps 1/30, you can get some available-light detail in the church. Now there's a little atmosphere. The flash properly exposes the bride and groom. And the slow shutter speed captures some available-light exposure, Fig. 30.

You can carry the concept a little further when you're shooting subjects that consist of light—fires, Christmas-tree lights, slides projected on a screen, etc. Remember that you can't take a picture of light using light. If you're shooting a flash picture of a group of people sitting around a campfire, you'll get a good exposure of the people—but there may be no fire in the picture.

Here you can use an "open-flash" technique. Use the flash to expose the people. But use a slow shutter speed—or even hold open the shutter on bulb—to expose the fire.

With a blade-type shutter, you can use any shutter speed with electronic flash. However, a focal-plane shutter limits the shutter speeds you can use. You can use the flash speed, normally 1/60, and any slower speed. But you can't use the faster speeds.

At the faster speeds, the second curtain is within the film area when the flash fires. Thus the second curtain prevents flash exposure to part of the picture. A sharp line—the edge of the curtain—divides the picture into two sections: the properly exposed flash picture on one side and the underexposed (or even black) area on the other side.

The dedicated flash units eliminate the problem with focal-plane shutters. When the dedicated flash unit charges, it automatically sets the camera to the flash speed. But there's one creative drawback. You may not be able to use shutter speeds slower than the flash speed with dedicated flash.

FILTERS FOR B&W PHOTOGRAPHY

A filter provides a technique for changing the color sensitivity of the film. One type of filter is a colored piece of glass that mounts to the front of the lens, Fig. 31. Here, it "filters" the light passing through the lens to the film.

The filter transmits light of its own color. It absorbs light of a complementary color. The color star shown earlier, Fig. 2, shows you the effect of a certain filter color on B&W film. For example, a red filter transmits red. A red color in the scene then appears darker in the negative—and lighter in the print. What color will appear darker in the print? The complement of red—cyan, or blue-green.

There are two basic reasons you might want to change the color response of the film:

1. You might want to correct the response of the film to more closely match that of the human eye. A filter used to match the film's sensitivity to the eye's sensitivity is a **correction filter**.
2. You might want to provide more contrast between certain colors for effect. Rather than correcting color sensitivity, you're actually changing the brightness values to make certain colors appear darker or lighter than reality. Filters designed for this purpose are called **contrast filters**.

Here's an example. Suppose that you're photographing an outdoor scenic that includes blue sky and white fleecy clouds. To your eye, the sky appears blue and the clouds appear white; there's a definite distinction between the sky and the clouds. But B&W film is oversensitive to the blue end of the spectrum. It even responds to the ultraviolet light in the sky.

As a result, the sky records darker than it should on the negative. On the print, the sky appears washed out—nearly the same shade of gray as the clouds, Fig. 32. You've lost the separation between the clouds and the sky.

A medium-yellow filter blocks out enough of the blue to make the sky appear normal. The filter darkens the sky (in the print) just enough to provide separation between the sky and the clouds. A red filter darkens the sky even more, Fig. 33, for a dramatic effect.

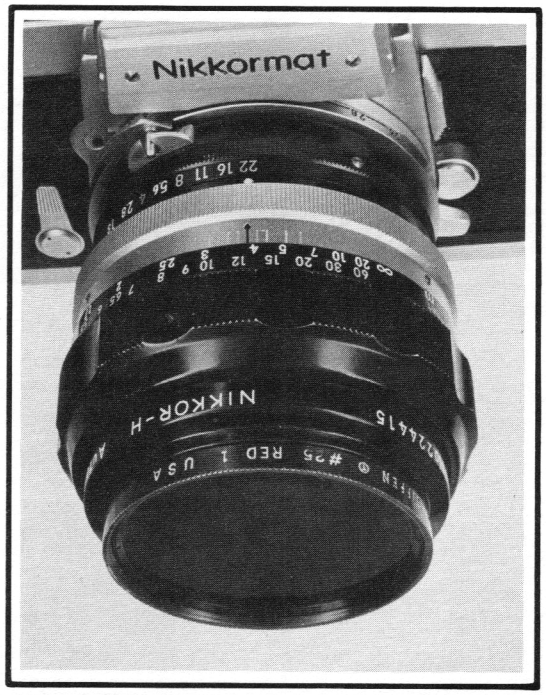


Figure 31

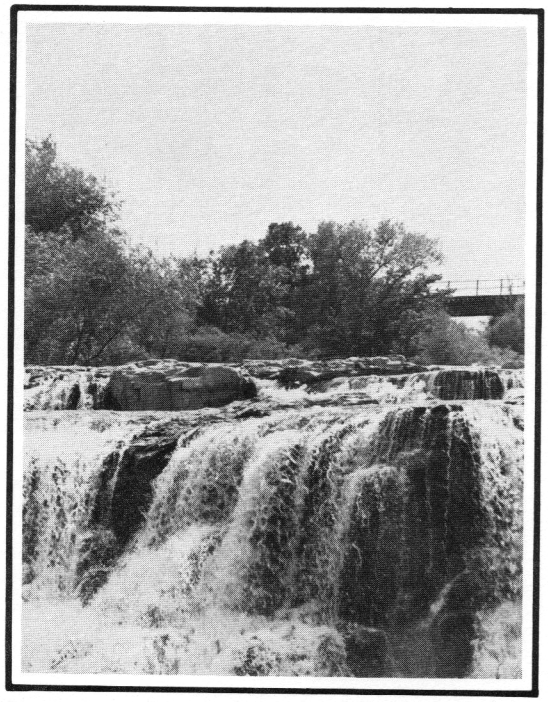


Figure 32

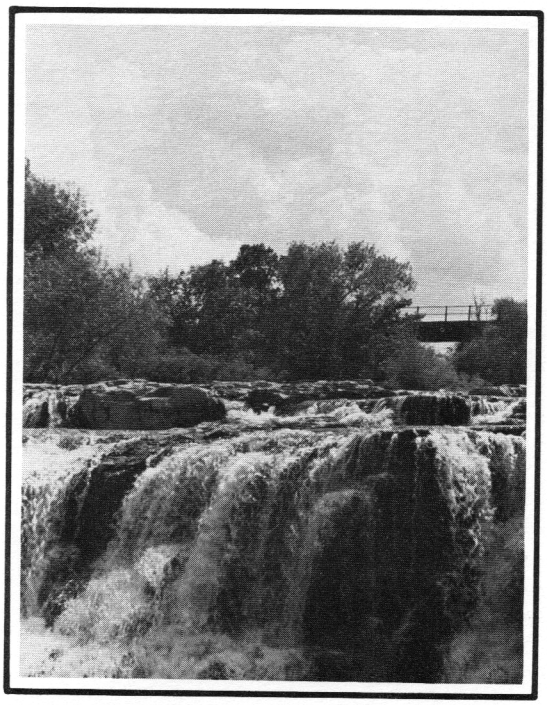


Figure 33

FILTER COLOR	TRANSMITS	ABSORBS
red	red	blue, green
orange	orange	blue
yellow	yellow, red, green	blue
green	green	red, purple
blue	blue	red, green, yellow
cyan	cyan, blue, green	red
magenta	magenta, red, green	blue

Figure 34

The chart in Fig. 34 shows the effects of the different filter colors. Notice that the orange filter also darkens blue. Thus there are three filters you could use to darken the sky—yellow, orange, and red. Yellow darkens blue the least, and red darkens blue the most.

You can consider the medium-yellow filter to be a correction filter. It restores gray tones to their normal brightness values, matching the film's sensitivity to that of the human eye. The red filter and the orange filter are contrast filters.

Photographers also use the red filter for special effects. For example, you can achieve a moonlight effect during the day by underexposing with a red filter. Fig. 35 shows a normal scene; Fig. 36 shows the same scene shot at the same time of day with a red filter and a two-stop underexposure. But you generally would not want to use a red filter for pictures of people—especially of women. Since red lightens its own color on the print, a woman's red lipstick appears white.

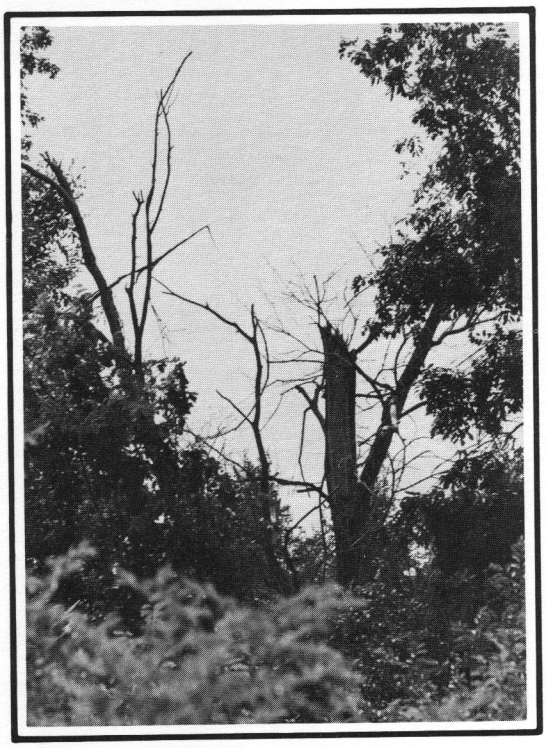


Figure 35 Normal exposure with no filter

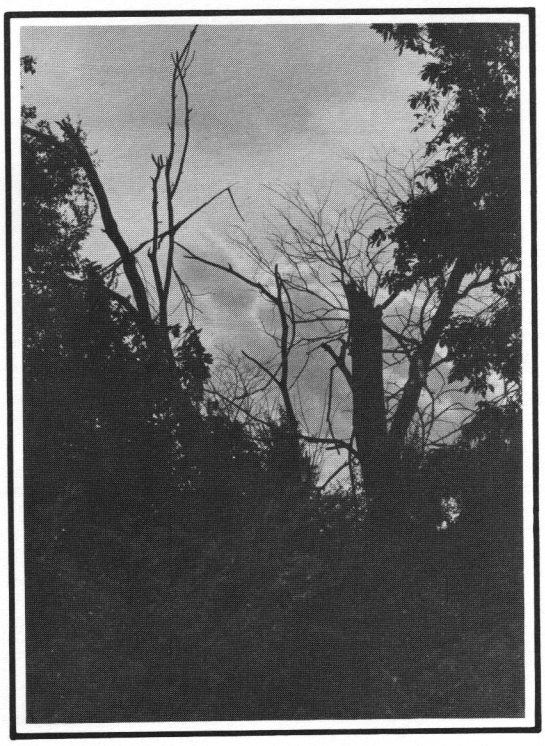


Figure 36

The same scene as Fig. 35. But now we're using a red filter and a two-stop underexposure to get the moonlight effect.

FILTER FACTORS AND SIZES

Since a filter absorbs some of the light, it reduces the total light reaching the film. You must therefore increase your exposure to compensate for the light loss. The **filter factor** tells you how much of a correction you need.

A medium-yellow filter normally has a filter factor of "2." That means you need twice the normal exposure. If your exposure meter says to use f/16, use f/11. Or you can double your exposure time—like using 1/125 second rather than 1/250 second. A filter factor of "2" then means to open up one stop.

If your camera has through-the-lens metering, you don't have to worry about the filter factor. The camera's metering system automatically compensates for the light loss. For other cameras, refer to the chart, Fig. 37; the chart shows how much to increase the exposure according to the filter factor.

You may even want to combine two filters for special effects. In that case, you must determine the filter factor for the combination. Just multiply the individual filter factors. If one filter has a filter factor of "2" and the other filter has a filter factor of "3," the filter factor of the combination becomes 3 x 2 = 6.

Most filters screw into the threaded filter ring at the front of the lens. Different lenses have different thread sizes. By measuring the inside diameter of the filter ring, you can determine the thread size you need.

For example, most Nikon lenses require a 52mm filter. The diameter of the filter threads must measure 52mm to fit the lens. Most Canon lenses, though, take a slightly larger thread size—55mm. And several lenses take the 49mm filter size. Other types of filters have bayonet mounts or fit into special filter holders.

FILTER FACTOR	NUMBER OF STOPS TO OPEN DIAPHRAGM
1.2	1/3
1.5	2/3
1.7	2/3
2	1
2.5	1 1/3
3	1 2/3
4	2
5	2 1/3
6	2 2/3
8	3
12	3 1/3
16	4

Figure 37

FILTERS FOR COLOR PHOTOGRAPHY

Unless you're after a special effect, you normally wouldn't use a colored filter with color film. The filter only transmits light of its own color. So, if you use a red filter with color film, you get a red monochrome (one color).

But you can use certain filters for both color and B&W photography. One of the most popular of the dual-purpose filters is the **ultraviolet (UV) filter**. On B&W film, ultraviolet light can cause overexposure to the sky in scenics. The effects of ultraviolet light are even more noticeable on color film—an overall bluish cast to the picture.

An ultraviolet filter filters out the ultraviolet light. Since the UV filter has no effect on visible light, it requires no increase in exposure. Many photographers leave the UV filter on the lens at all times. Besides filtering out ultraviolet light, the filter protects the lens from scratches.

You can also use the **neutral-density (ND) filter** for both color and B&W. The ND filter simply reduces the light passing through the lens. It has no noticeable effect on the color temperature.

Suppose, for example, that you're shooting high-speed film outdoors. And you want to use a larger f/stop than the lighting conditions will permit—perhaps to limit the depth of field. You can then decrease the light reaching the film by using a neutral-density filter. The gray-colored ND filters come in different densities.

Next to the UV filter, though, the most widely used dual-purpose filter is probably the polaroid filter—or, more properly, **polarizing screen**. Light, as you've learned, vibrates in all planes from the source. But polarized light vibrates in only one plane.

The light may be polarized when it reflects from glass or water. This polarized light often causes glare or hot-spots in the picture. The polarizing screen can eliminate the glare by blocking out the polarized light.

In effect, the polarizing screen works like a series of parallel slots. If those slots are parallel to the plane of the polarized light, the filter has no effect. But by rotating the filter, you can block out as much of the polarized light as you want.

Suppose, for example, that the polarized light vibrates on a plane that's horizontal to the camera. And you've positioned the polarizing screen so that the slots also run horizontally. Here, the polarizing screen has no effect—the polarized light passes through the slots.

As you rotate the polarizing screen out of the horizontal plane, less of the polarized light passes through the slots. Positioning the slots at a right angle to the plane provides the maximum effect.

If you're using a single-lens reflex, you can see the effect of the filter position. Perhaps you're using the polarizing screen to eliminate the reflections in a window. While watching the focusing screen, rotate the polarizing screen until the reflections are minimized.

The concept of polarized light also helps in photographing documents or photographs. However, most photographers then place the polarizing screen over the light source. By illuminating the subject with polarized light, you can completely eliminate glare.

Yet the polarizing screen probably gets the most use in photographing color scenics. Much of the light coming from the sky is polarized. As a result, the sky may appear too white. By blocking the polarized light, the polarizing screen gives you a deeper blue in the sky. Just rotate the polarizing screen until you get the amount of darkening you want.

Since the polarizing screen blocks some of the light, you do need an exposure compensation. Most polarizing screens have filter factors of 2.5.

CONVERSION FILTERS

A conversion filter corrects the color response of the film according to the type of illumination. Perhaps you want to shoot daylight-type film indoors or tungsten-type film outdoors. You can get correct color balance by using the proper conversion filter.

The 80A conversion filter corrects the color balance when you're shooting daylight-type film under tungsten illumination. If you're shooting daylight-type film with photofloods, use the 80B conversion filter. The 85 correction filter allows you to use tungsten-type film (Type A film) outdoors.

SPECIAL EFFECTS

Just about anything that alters the "straight" picture can be considered a special effect. Many photographers have developed their own tricks to make their pictures different. But now

just about anyone can shoot a variety of special effects. Several manufacturers provide filters and other accessories that do most of the work. Let's now look at the more popular special effects:

Soft Focus

In portraiture, the most useful special effect may be soft focus. Some say a sharp lens has no place in portraiture. Why? Because people don't want their portraits to show every imperfection. With soft focus, you can merge fine details while maintaining overall sharpness. Imperfections such as wrinkles and blemishes become less noticeable, often eliminating the need for retouching.

Compare the straight bridal portrait, Fig. 38, with the soft-focus version, Fig. 39. Notice that the soft-focus portrait hides fine detail in the complexion. Chances are the bride will be more pleased with the soft-focus portrait. Yet, if you show her both portraits together, she may very well pick Fig. 38 because it appears sharper.

There are several tricks you can use to soften the focus. One is to fog the lens with your breath—shoot before the fog clears. Another is to place a piece of black net or tulle either in front of or behind the lens. The black tulle holds back some of the detail by holding back some of the light.

But you probably get the best results from the special soft-focus lenses. Here, a disc with a series of holes, Fig. 40, sits within the optical group. The large hole in the center of the disc allows the lens to form a sharp, properly exposed image. Each of the smaller holes results in an underexposed, off-axis image. The images superimpose, giving the appearance of overall sharpness while causing fine details to merge together.

A typical soft-focus lens comes with three such discs. Each disc provides a different amount of softening. The f/stop you use provides another control; the larger the f/stop, the greater the softening effect. Normally, you would soften a portrait of a woman a little more than a portrait of a man. You might also want to provide maximum softening for a dreamlike, misty effect.

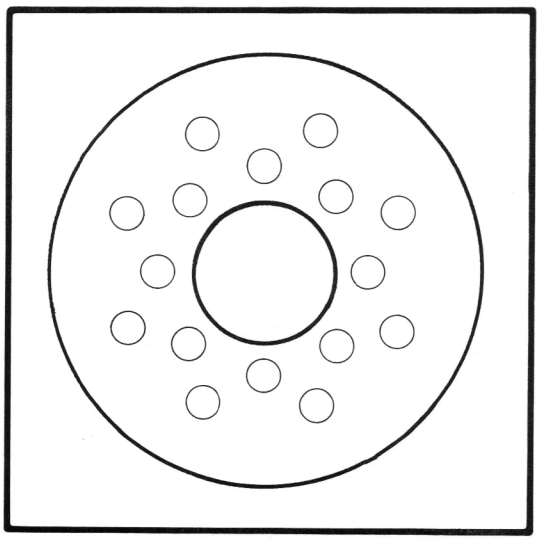


Figure 40 **Soft-focus disc**



Figure 38



Figure 39

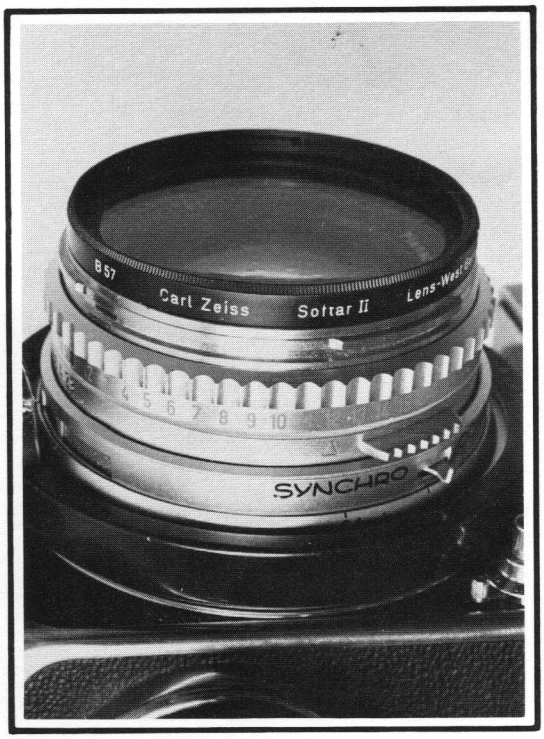


Figure 41

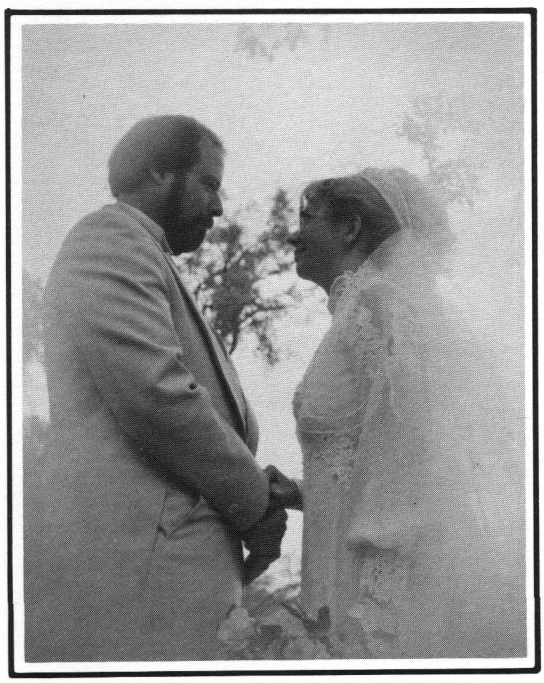


Figure 42

For Hasselblads, you can get another type of soft-focus device—the special Softar supplementary lenses. The Softar attaches to the front of the lens like a filter, Fig. 41. Tiny circles appear across the entire surface of the Softar—those circles are actually individual lenses. Many photographers claim they can equal the Softar effect by putting drops of clear lacquer (such as clear nail polish) on an ultraviolet filter.

You can also use diffusion filters to soften the image. Rather than causing multiple superimposed images, the diffusion filter simply scatters the light. However, the diffusion filter can't match the quality of a soft-focus lens. The result may look more like poor image quality than soft focus.

Vignetters

By vignetting the picture, you can center the attention on your subject. A vignetter softens or obscures the edges of the picture. But the center of the picture remains sharp, Fig. 42.

Fig. 42 shows the effect of a white vignetter placed in front of the lens. The image gets gradually lighter, finally going nearly white at the edges. Another type of vignetter—the dark vignetter—causes the image to darken gradually and go nearly black at the edges. An oval cutout in the center of the vignetter allows the center of the image to remain unaffected.

The white vignetter shown in Fig. 43 vignettes just the bottom of the image. In Fig. 43, we've installed the vignetter in a matte box (or "pro hood"). The matte box is a bellows-type lens hood designed to hold vignetters and other accessories.

Notice in Fig. 43 that the white vignetter has a sawtooth pattern. The teeth cause the gradual vignetting effect. If you're using a sawtooth vignetter, though, you need a fairly large f/stop—f/8 or larger. With a smaller f/stop, the depth of field may cause the sawtooth pattern to show on your picture.

Generally, you should use the white vignetter only with a white or light-colored background. Use the dark vignetter with a dark-colored background. But the color of the background doesn't matter with a third type of vignetter—the translucent vignetter. The translucent vignetter doesn't darken or lighten the edges; rather, it just softens or distorts the edge detail.

One type of translucent vignetter uses a prism wedge to distort the bottom of the picture area. You can get the same effect by holding a piece of crumpled cellophane—perhaps from a pack of cigarettes—in front of the lens. Move the cellophane until it just covers the area you want.

The "greased-lens" technique provides another popular variation of the vignette. Here, you smear Vaseline around the outer edges of the lens (or preferably around the edges of a filter—it's a major job to clean Vaseline from the lens). Leave the center clear. The Vaseline causes the edges of the picture to diffuse into a soft flow of colors and shapes.

With any type of vignetter, though, you should check the effect at the taking aperture. The effect increases as you stop down the lens. At the maximum aperture, the vignetter may appear to affect only a small portion of the picture. But the vignetter covers more and more of the picture as you stop down the lens. If your camera has a depth-of-field preview, you can easily check the effect before you take the picture.

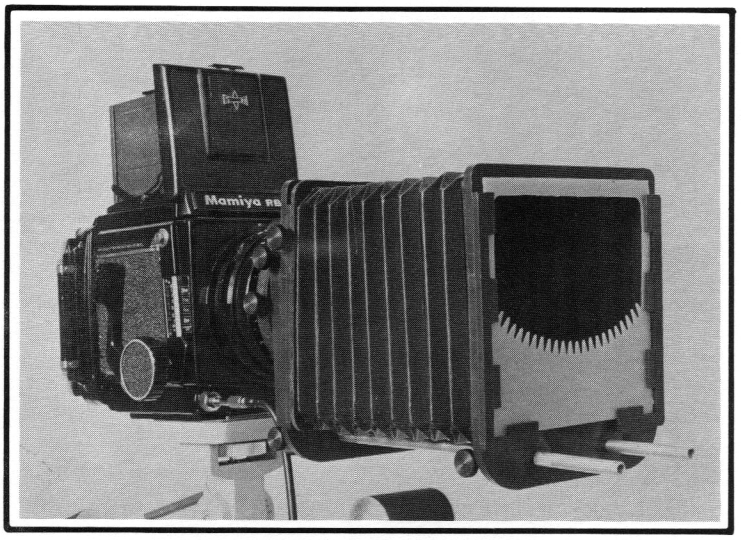


Figure 43

Star Filters and Diffraction Gratings

The star filter causes a light source to radiate spikes of light, Fig. 44. Any light source in the scene then has a star effect. You can get star filters with different numbers of points—four-point stars, eight-point stars, etc. The star filter also doubles as a diffusing filter. Besides making stars out of light sources, it provides a soft-focus effect.

A diffraction grating similarly causes the image of a light source to radiate spikes of light. But the diffraction grating also disperses the light. The spikes then appear in a rainbow-colored pattern.

Star filters and diffraction gratings rotate in their mounts. You can then position the radiated light pattern the way you want. Or, with long exposures, you can rotate the filter while the shutter is open. Rather than spikes of light, you then get a soft halo around the light source as the spikes merge together.

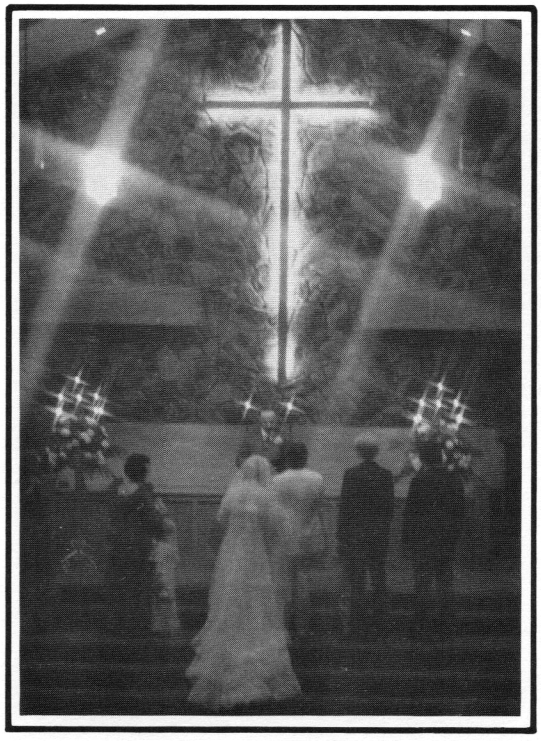


Figure 44

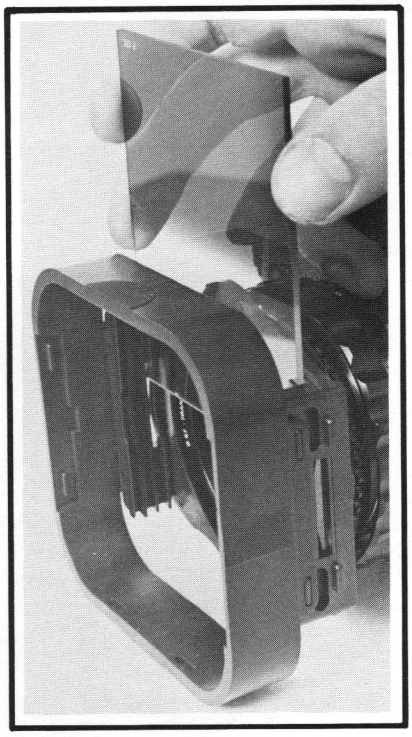


Figure 45

Other Special-Effect Filters

Slightly altering the color balance produces a more subtle special effect. For portraits, photographers sometimes use warming filters. The warming filter, light orange in color, provides warm, healthy looking skin tones. But the effect is so subtle that most people probably wouldn't realize a filter was used.

You can exaggerate the effect by using an orange filter with color film. Perhaps you're shooting with electronic flash. Yet you want the picture to have an available-light appearance. An orange filter, such as the 81C, over the lens or flash unit provides the special effect.

When you alter the color balance for a special effect, you should let the processor know what you've done. Include a note such as, "warm colors intentional." Otherwise, the processor might attempt to correct the colors in printing.

Special-effect filters became even more versatile when Cokin introduced the square-filter system, Fig. 45. Now other manufacturers offer similar systems. With the square filters, it's possible to alter only a select portion of the picture.

For example, the graduated filter shown in Fig. 45 allows you to change the color of the sky without affecting the rest of the picture. About half of the filter is colored; the other half is clear. By sliding the filter up or down in the mount, Fig. 45, you can add color to a select portion of the picture. The tobacco-colored filter gives the sky a late-evening appearance. Other colors allow different effects.

Another of the square filters consists of a diffusion filter with a hole cut in the center. The "center spot" serves as a translucent vignetter. You can get center spots in a variety of colors.

Other special-effect filters include the fog filters which diffuse the light to give a foggy appearance to the scene. The fog filter is similar to the diffusion filter. But it scatters the light at a wider angle and allows a little more detail.

Multiple-image filters use prism wedges to provide two or more identical images on the same frame. The number of prism wedges decides the number of images.



Figure 46

Double Exposures

The most special of all the special effects may be the double exposure, Fig. 46. Several cameras allow intentional multiple exposures. You can then shoot as many exposures as you want on a single frame. Most multiple-exposure systems simply disengage the sprocket; you can then cock the shutter without advancing the film.

Composition becomes critical when you're shooting a double exposure. You have to decide in advance where you want the two images. Visualize the position of the second image as you shoot the first image. And remember the position of the first image as you shoot the second image.

How about exposure? If the two images overlap, you should underexpose each one by about half a stop. Or you can expose one image normally and underexpose the second image by one or two stops. The underexposed image then has a "ghost" appearance.

But if the images don't overlap, you need no exposure compensation. You just have to place each separate image on unexposed film. One technique involves using a black backdrop. Position your subject at one side of the frame for the first exposure. Then position the subject at the other side of the frame for the second exposure.

Thanks to the black backdrop, each image goes on unexposed film. And you need no exposure compensation. However, you may not always have a black backdrop to protect the film.

There's another technique you can use to provide unexposed film for each exposure—the "finger block." With a finger block, you block off part of the lens while you're shooting the first exposure. Then, as you shoot the second exposure, protect your first image by blocking off the other part of the lens.

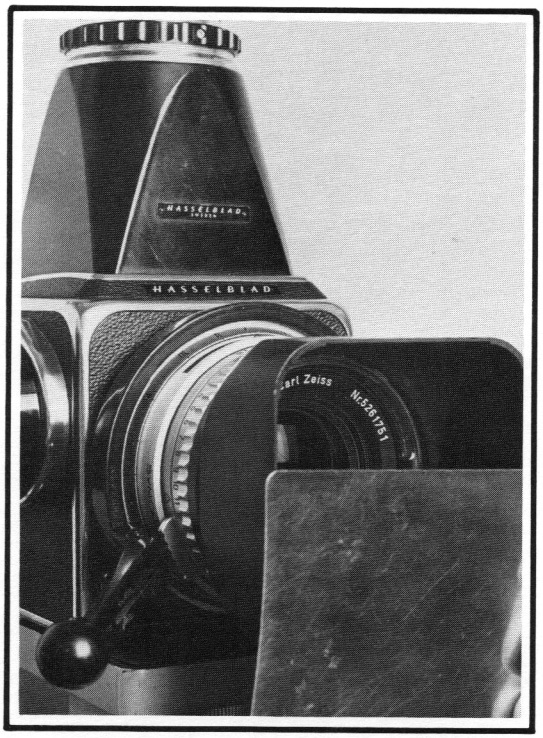
Fig. 47 illustrates the technique. Here, we're using the camera's dark slide to block the lens. However, you could also use your hand, a piece of cardboard, or just about anything that's opaque. To prevent any color fringe, some photographers prefer to use a black material to block the lens. You can simply wear a black glove on one hand to use as your finger block.

But don't block the lens exactly in half. Rather, block off about 40% of the lens for each exposure. Each of the two separate images then covers around 60% of the frame. Allowing the images to overlap slightly avoids a sharp dividing line; the images blend together at the dividing edge.

You should also provide some separation between the blocking material and the lens. In Fig. 47, the lens hood provides the separation. Or you can use a matte box like the one illustrated earlier, Fig. 43. The matte box allows a more predictable variation of the finger-block technique. You can then use precut masks—or "mattes"—to protect the film. The mattes slip into the holder at the front of the matte box (the position of the vignetter in Fig. 43).

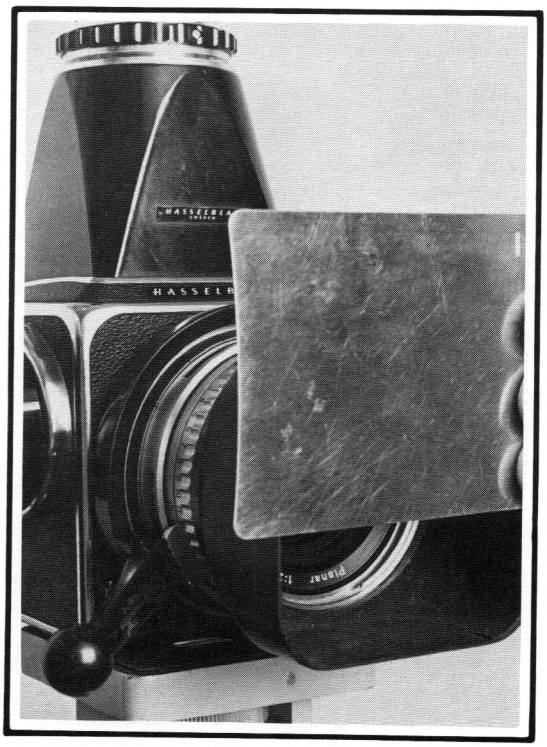
For example, in Fig. 46 we first shot the smaller image against a black backdrop. We then used a matte to protect the smaller image while shooting the larger image. With a double-exposure portrait, the two images should be distinctly different in size. Otherwise, it may appear as though your subject has two heads.

Whether you're using a matte box or a finger block, your f/stop again makes a difference in the effect. The smaller the f/stop, the larger the area that will be blocked. Always check the effect at the taking aperture—the f/stop you're going to use to shoot the picture.



A

Figure 47



B

PORTRAITS

Portraits may be among the toughest of all pictures to take. Here, you have to be more than a photographer—you also have to be an entertainer. And very few people are easily satisfied with pictures of themselves.

How do most people judge pictures of themselves? By the expressions. Technically, a portrait may be outstanding as far as composition, lighting, and exposure. But if the expression fails, the portrait fails.

When shooting a posed portrait, you must first get your subject to relax. Don't just say, "Relax." That'll never work. A person faced with a camera and lights isn't in a natural environment; there's no "relax button" he can push.

Instead, talk to your subject. Talk about something in which your subject is interested. If you want a happy expression, get your subject to think about a happy situation. That way, you'll get a smile in the eyes as well as on the mouth.

The subject's eyes are the most important elements of the portrait. Even if the other areas go a little soft, the eyes should be sharp. Plus you want expression in the eyes.

There are two basic types of portraits:

1. formal portraits
2. informal portraits

Most formal portraits are posed head-and-shoulders shots. But the formal portrait can also be 1/2 body, 3/4 body, or full body. The subject may or may not be looking at the camera. Backgrounds are usually plain. And there's nothing in the picture to distract your attention from the subject's face.

To tell you something about the subject, the formal portrait relies on pose and expression. An informal portrait, however, often uses other picture elements to give you this information. For example, you might pose a tennis player with a racquet or a businessman at his desk.

You may prefer to photograph the subject actually in the process of doing something. Or you might carefully pose the informal portrait. But no matter how carefully you pose your subject, the informal portrait should not look posed. That's one element that distinguishes the informal portrait from the formal portrait—the informal portrait looks natural.

One of the favorite types of informal portraiture is the interrupted-action portrait. Here, it's obvious that your subject is engaged in some activity. Yet the subject is looking up from whatever he's doing—usually, but not necessarily, at the camera. The portrait then gives the interrupted effect, as if the viewer had just walked in and interrupted the subject.

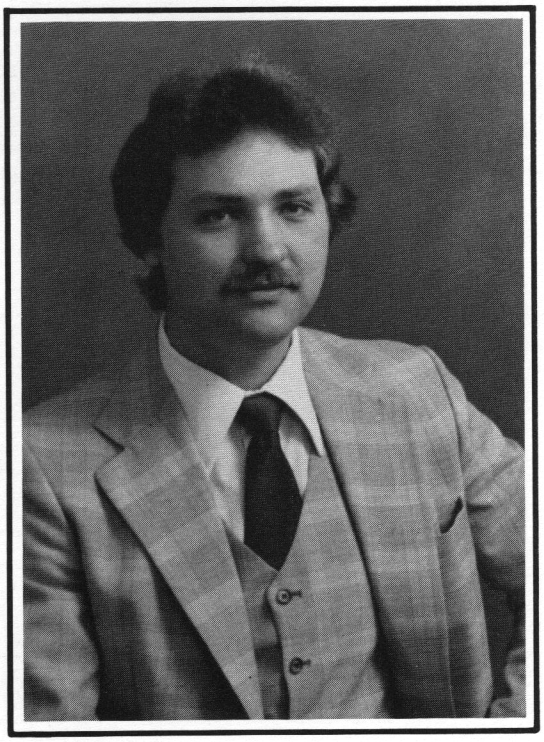


Figure 48

Although the expression remains the key element in any type of portrait, there are a few other basics that can improve your pictures. The guidelines vary slightly for men and women. Most women like to appear feminine, and most men like to appear masculine. Even in a head-and-shoulders portrait, you can use subtle posing techniques to give the desired effect.

The tilt of the subject's head can carry the message. For a masculine effect, have the subject hold his head square to his shoulders, Fig. 48. Or have the subject tilt his head toward the shoulder further from the camera—his left shoulder in Fig. 48. The head now has a "masculine tilt."

But don't allow a man to tilt his head toward the other shoulder—the higher shoulder or the shoulder closer to the camera. That's the "feminine tilt." Your subject appears effeminate. And he's not going to be pleased with the portrait.

You can have a woman use either the feminine tilt or the masculine tilt. Fig. 49 shows the feminine tilt, and Fig. 50 shows the masculine tilt. The effect changes, but both poses work.

Notice in Fig. 49 and Fig. 50 that the shoulders and the head turn in different amounts. If you pose the subject with head and shoulders square to the camera, you have the typical "mug shot," Fig. 51. Avoid the mug shot by having your subject turn his or her shoulders at about a 45° angle to the camera. Then turn the face toward the camera, thereby giving a flow to the portrait.

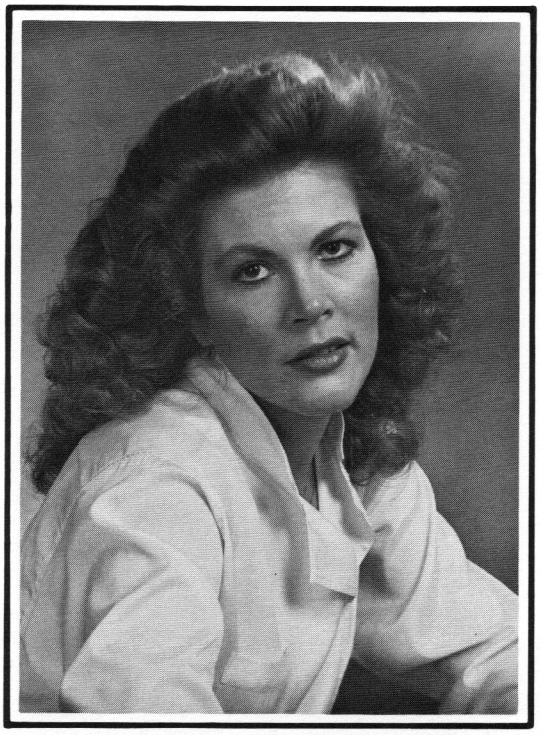


Figure 49 **The feminine tilt**



Figure 50 **The masculine tilt**

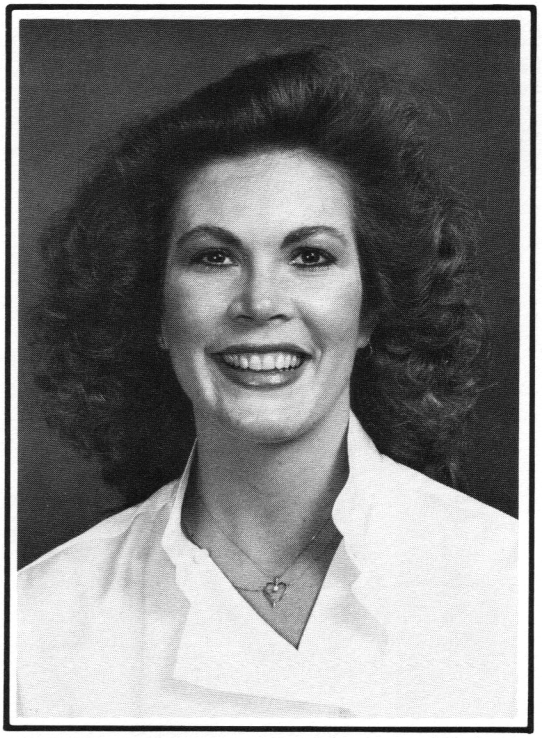


Figure 51
The mug shot, suitable only for a driver's license or a police lineup.

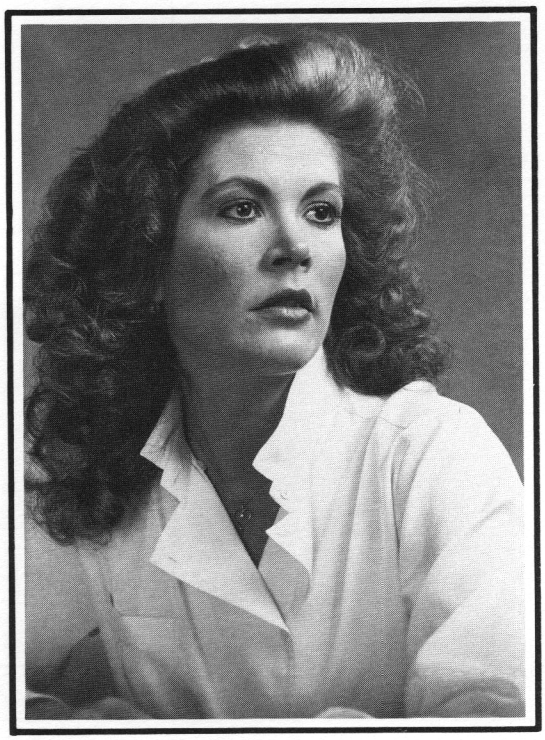


Figure 52

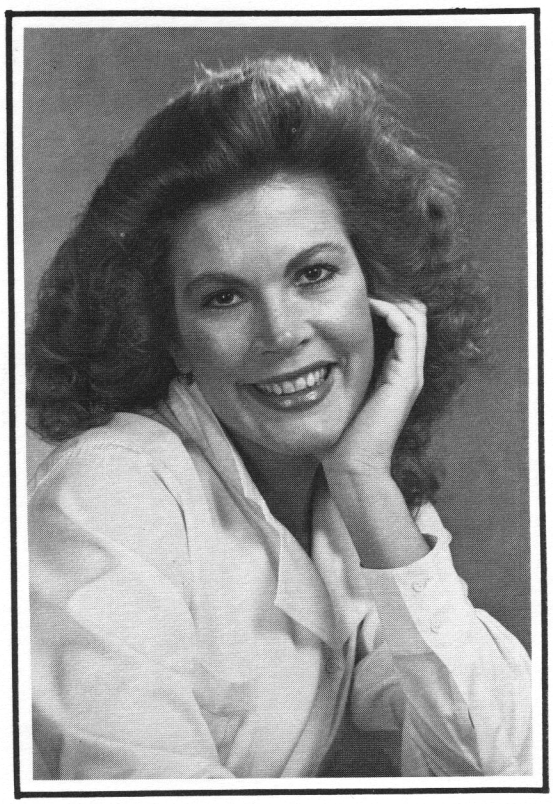


Figure 53

For a woman's portrait, the more flow the better. The more places your subject bends, the more feminine she appears. You might have her shoulders facing one direction with her head turned the opposite direction, Fig. 52. But the pose shown in Fig. 52 may not flatter a man. You can make a man appear masculine by allowing relatively few body bends.

You can certainly break the rules to achieve the desired effect. Perhaps you're photographing a businesswoman behind her desk. Now you might not want to accent feminine grace; you might instead want to show the importance of her job. Keeping her head square to her shoulders and allowing a minimum number of body bends might be more appropriate.

If you want to include the subject's hands in the portrait, use caution—hands can be difficult to show. Generally, you should avoid shooting into the back of the hand; the back of the hand usually isn't attractive. Try instead to show the palm side or just the edge of the hand, Fig. 53.

Also, if you're going to show a hand, show the complete hand. If you show just part of the hand—or if the subject has his or her fingers folded back—the hand looks deformed in the picture. Here's a good rule to follow: if you can't make the hands look natural and attractive, eliminate them from the picture.

You can even flatter or offend your subject by the angle of the face. There are three basic facial angles—full face (both ears showing), 3/4 face, and profile. The full-face view shows the entire width of the face, Fig. 51. So, if you're photographing a heavy subject, you should usually avoid the full-face shot.

To make your subject appear thinner, show just a portion of the face—the 3/4 angle, Fig. 52. Have your subject turn his or her head until the eye furthest from the camera (her left eye in Fig. 52) just starts the picture. That is, there's no face showing to the other side of the eye. You can further increase the "slimming" effect by lighting the short side of the face as in Fig. 52 (the side away from the camera). The broad side of the face—the side the camera sees more of—then goes into shadow.

The profile, by showing only one side of the face, has the maximum slimming effect. But not everyone has a flattering profile. If the subject wears glasses, has a crooked nose or weak chin, etc., you should probably avoid the profile pose.

With a profile, follow the composition rule we mentioned earlier—leave more room in the direction in which your subject is looking. If you don't leave this room, the subject appears cramped, Fig. 54. Also notice in Fig. 54 that we've shot directly into the subject's shoulder. As a result, the profile has no base to the composition. It appears that the head lacks support.

Rather, have your subject turn his or her shoulders either toward the camera or away from the camera, Fig. 55. Now you have a base to the composition. In addition, we've allowed the proper amount of space to the front of the subject in Fig. 55. Here's the general rule: draw an imaginary line that vertically divides the picture in half; your subject's nose should just cross the dividing line.

The amount the head turns can also be critical in a profile. Ideally, only the eyelash of the hidden eye should show. If the subject's head turns too far toward the camera, you encounter another problem—the nose breaks the cheekline, causing some

distortion to the face, Fig. 56. When the nose breaks the cheekline, one eye lacks support. Photographers call the effect of Fig. 56 a "split profile."

Here are a few additional guidelines to look for in portraits:

1. The subject's eyes should be approximately centered in their sockets. Showing too much white in the eye gives the impression that your subject is about to faint.
2. Generally, have your subject tilt up his or her face. A face tilting up gives the impression of optimism (as well as eliminating double chins). A face tilting down can give the feeling of depression. However, if you show your subject looking down at some object, the portrait can give the impression of deep thought.
3. For a head-and-shoulders portrait, the camera should be about eye-level with the subject. However, if you're showing more of the subject, you should lower the camera to around chest-level or even waist-level. Too high a camera angle causes a foreshortening of the subject's body. The body appears too short with respect to the head size.
4. If your subject wears eyeglasses, make sure the tops of the frames don't partially obscure the eyes—glasses tend to slip down on the nose. To avoid reflections, you can have the subject tilt his or her face down slightly. Alternately, raise the bows off the subject's ears a slight amount—the lenses of the eyeglasses then sit at an angle to your lights.



Figure 54 A centered profile appears cramped.

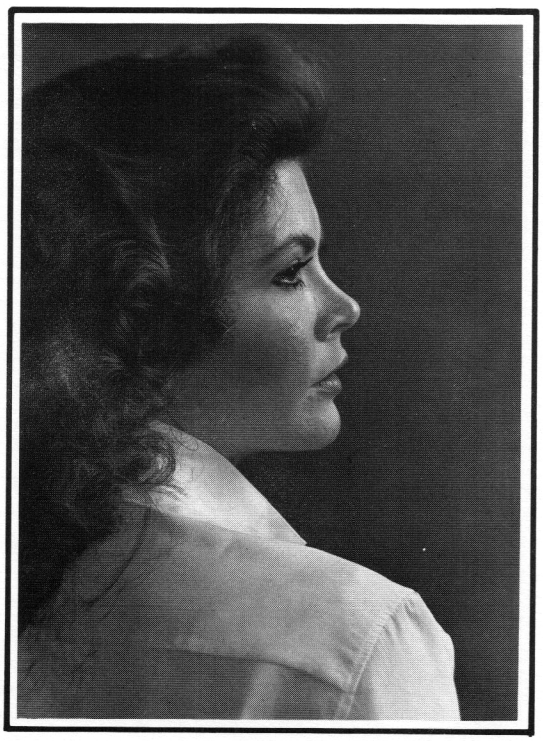


Figure 55
Allow more room in the direction the subject faces. And use the subject's shoulders to provide a base for the composition.

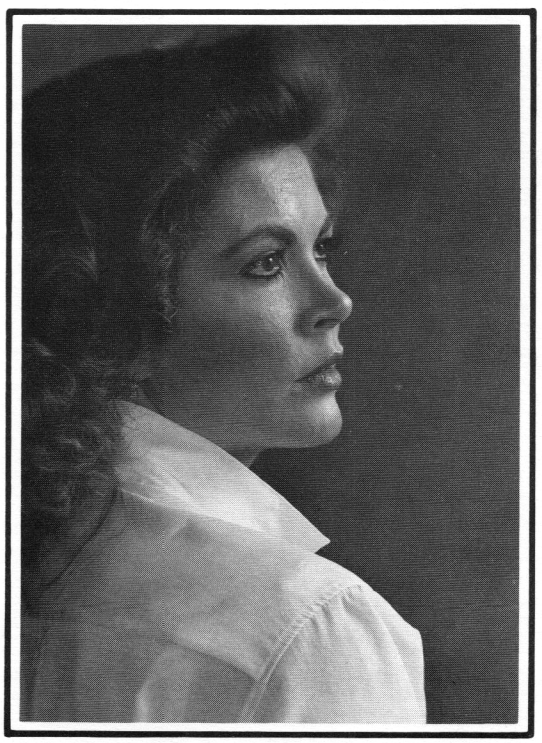


Figure 56 The split profile

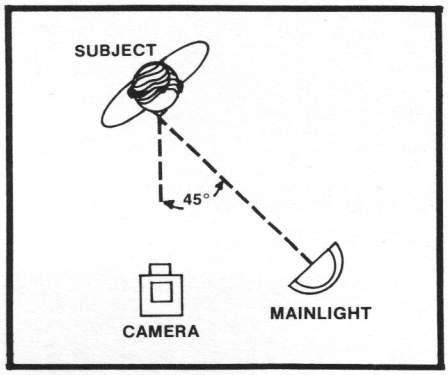


Figure 57 45° lighting

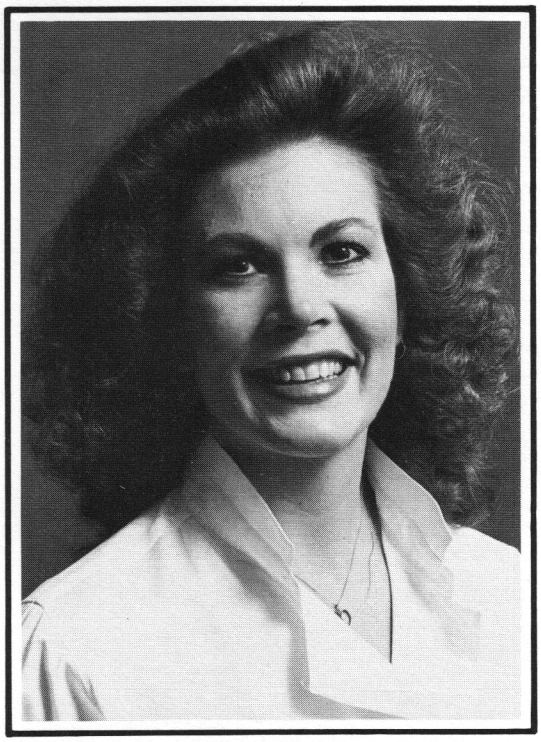


Figure 58 45° lighting

PORTRAIT LIGHTING

Your pictures of people will improve if you understand portrait lighting setups—even multiple-lighting arrangements. You may not have access to multiple studio lighting. But you can obtain many of the same effects with a single electronic-flash unit and a white cardboard reflector.

Let's first consider that you're shooting a head-and-shoulders portrait using a single light source. Further, suppose that you're using a photoflood so you can see the effects of the light position.

Where do you now place the light in relation to your subject? There are three standard positions for the mainlight (or "key" light). The classic portrait setup places the mainlight at a 45° angle to the subject, Fig. 57.

The mainlight should also illuminate the subject from above. Why? Shadows then fall across the face from top to bottom—the effect of sunlight. But if you place the mainlight too high, the eyes of your subject will be in shadow.

You can judge the proper height by watching the catchlights in your subject's eyes—reflections from the mainlight. Start with the mainlight in a high position. Then lower the mainlight until you see the catchlights, Fig. 58. Notice in Fig. 58 that the catchlights are at 1 o'clock positions. If the mainlight were coming from the other side of the subject, the catchlights would be at 11 o'clock positions.

To judge the proper angle for the mainlight, look at the shadow formed by the nose, Fig. 58. The shadow should be pointing to the corner of the mouth—but not actually touching the mouth. If the shadow does touch the mouth, you might have to lower the mainlight a little more.

You can place the mainlight on either side of the subject. In Fig. 58, the mainlight comes from the left of the subject (to the right of the camera as in the diagram, Fig. 57). The mainlight now illuminates the short side of the face—that's called "short-key" lighting. If the subject had her shoulders turned the opposite direction, you'd have to put the mainlight on the other side of the camera for short-key lighting.

Short-key lighting puts the broad side of the subject's face (the side toward the camera) in shadow. That's why short-key lighting gives a slimming effect to the portrait. If you put the mainlight on the broad side of the face, you have "broad" or "broad-key" lighting.

How close should the light be to your subject? Remember, the closer the mainlight, the softer the illumination. Some photographers place the mainlight just outside the picture area. However, if you're working with photofloods, putting the light too close may be uncomfortable for your subject. You can then soften the illumination by bouncing the light off an umbrella, by using a larger reflector, or by putting a diffuser in front of the light.

Classical 45° lighting may not be the best for every subject. Since the light skims the face at an angle, it emphasizes texture. Facial imperfections then stand out. Try to position the subject's fact to put a scar or blemish on the shadow side.

A compromise lighting position many photographers prefer is called "short-loop" lighting. The name comes from the shape of the nose shadow. Just decrease the angle of the mainlight until the nose shadow appears as shown in Fig. 59—a short loop under one side of the nose. Decreasing the angle of the mainlight gives slightly flatter illumination that tends to fill in facial blemishes.

The third basic lighting position fills in facial blemishes even more. It's called glamour or butterfly lighting ("butterfly" coming again from the shape of the nose shadow). Butterfly lighting places the mainlight directly to the front of the subject, Fig. 60—high frontlighting. The shadow under the nose then forms a butterfly shape, Fig. 61.

Most of the advertising portraits and glamour shots you'll see use butterfly lighting. But for conventional portraits, 45° lighting remains the most popular. 45° lighting results in facial modeling that's complimentary to most subjects, Fig. 58. There's just one problem—a single light at a 45° angle may form too strong a shadow on one side of the face.

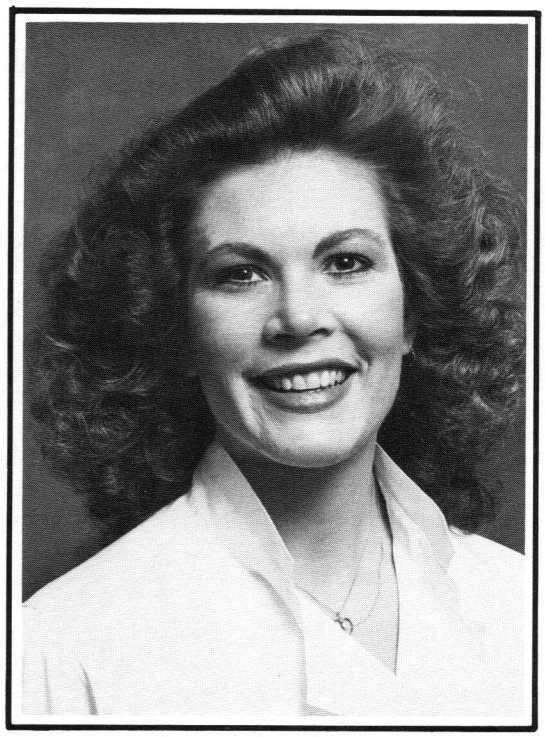


Figure 59 **Short-loop lighting**

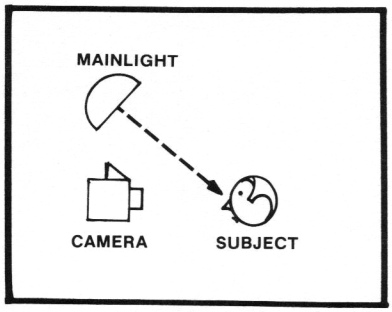


Figure 60 **Butterfly lighting**

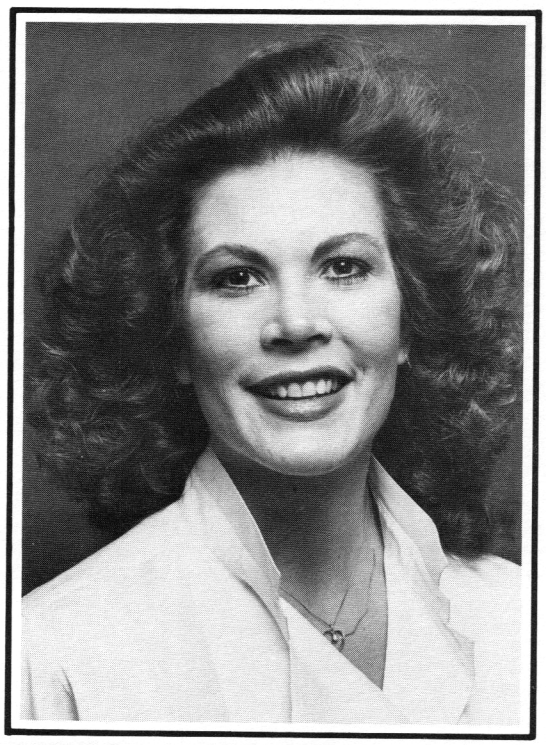


Figure 61 **Butterfly lighting**

This page 32 Modification has been prepared due to the discovery that our answer to question 19 of the quiz titled "PHOTOGRAPHIC TECHNIQUES", is in error. The main point of understanding is that, while the main light is, in effect, 4 times as bright as the fill, on the main side of the subject, MAIN and FILL combine to form 5 units of light onthe main side, versus 1 unit on the shadow side.

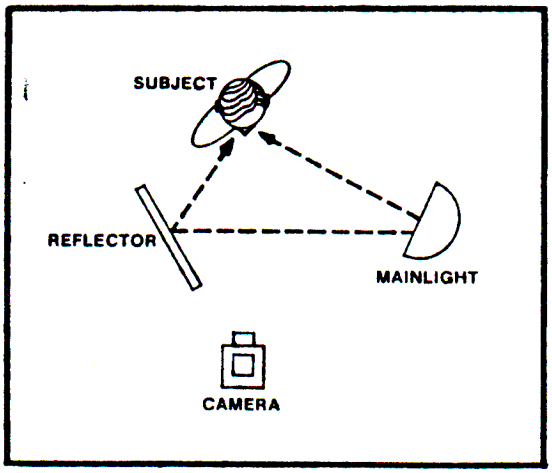


Figure 62

You can fill in the shadow side with a reflector, Fig. 62. The reflector—perhaps a piece of white cardboard or an umbrella—reflects part of the light into the shadow side of the face. Since the reflected light isn't as intense as the direct light, the reflector doesn't eliminate the shadows. It just lightens the shadows to provide more detail.

The reflector can give you the effects of a two-light setup. But you usually have to continually reposition the reflector to get the desired amount of fill light. Each time you move the mainlight or the subject, you have to move the reflector. To eliminate the fuss, most photographers use a second light for the fill—the fill light.

Your fill light must not compete with the mainlight—it must not throw shadows of its own. Otherwise, you get the unnatural effect of two light sources. The fill light should then be nondirectional. To achieve the flat nondirectional fill, place your fill light as close to the camera as possible—at about the same height as the lens. A large light source, such as a flash bounced off an unbrella, provides a good nondirectional fill.

Further, the fill light should be less intense than the mainlight. You still want the mainlight to throw shadows on the face for modeling. If the fill light eliminates those shadows, you have flat dimensionless lighting.

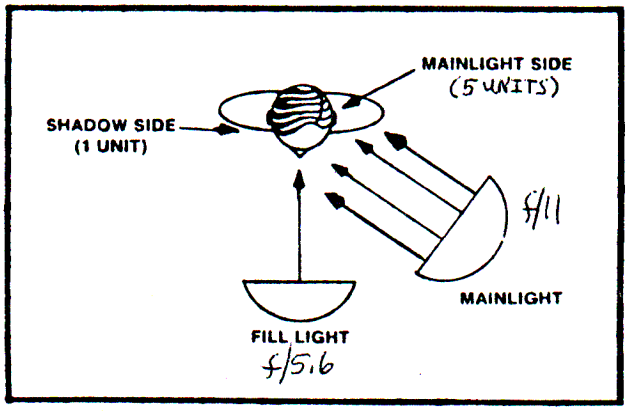


Fig Q

Base the strength of the fill light on the lighting ratio you want. Most portrait photographers probably use the 3:1 lighting ratio. For every three units of light on the mainlight side of the face, there's one unit of light on the shadow side.

Suppose, for example, that the mainlight calls for an f/stop of f/11. For a 5:1 lighting ratio, the fill light should provide proper exposure at f/5.6, 1/4 as intense as the mainlight. Fig. Q shows why you get a 5:1 lighting ratio when the mainlight has 4 x's the intensity of the fill.

Since the mainlight is 4 x's as bright, Fig. Q shows 4 brightness units from the mainlight. The fill light puts out one unit of brightness— 1/4 that of the mainlight. But the fill light illuminates the face evenly. Thus the mainlight side of the face receives 5 units of light— 4 from the mainlight and one from the fill light. The shadow side of the face receives only the one unit from the fill.

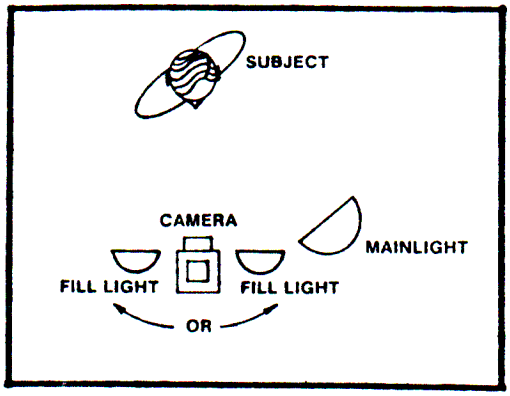


Figure 64

You can increase the dimensional effect by increasing the lighting ratio. Many photographers use a 3.5:1 or even a 4:1 ratio.

How would you then expose for a two-light setup? Some photographers expose for the mainlight and let the fill provide underexposure on the shadow side. But the general rule is to **expose for the fill and print for the mainlight.** That way, you're sure there's detail in the shadow areas.

Since the fill is nondirectional, it can go on either side of the camera—either on the mainlight side or on the opposite side, Fig. 64. Fig. 65 shows the effect of adding the fill to the 45° lighting (Fig. 58). Notice that the fill light adds an extra catchlight to each eye. You can normally spot how many front lights were used for a portrait by counting the catchlights.

The extra catchlight isn't usually objectionable. But if your subject wears glasses, the direct light from the fill causes reflections. You might then prefer to bounce the fill off the ceiling. As you've seen, bounce flash provides soft, even lighting which works well as a fill.

Remember that each full f/stop represents an aperture area increase of double, therefore, double the light, or twice the amount of light per f/stop increase. Two f/stop increase (f/11 to f/5.6) would then be 4 times the light value of the fill.

Portrait photographers often use additional lights to add to the impression of dimension. One such light puts a highlight in the subject's hair, Fig. 66. To add the hair highlight, you need a narrow light beam you can precisely direct. Some photographers use barn doors—metal flaps that can be moved to control the light beam, Fig. 67. Others use a snoot, Fig. 68, to provide a narrow beam of light.

Aim the light beam from behind the subject at a fairly high angle. Adjust the angle so the light just skims across the top of the hair. Be careful, though, that the light doesn't shine directly into the camera lens. And, again to avoid competing light sources, the hair highlight should come from the same side as the mainlight.

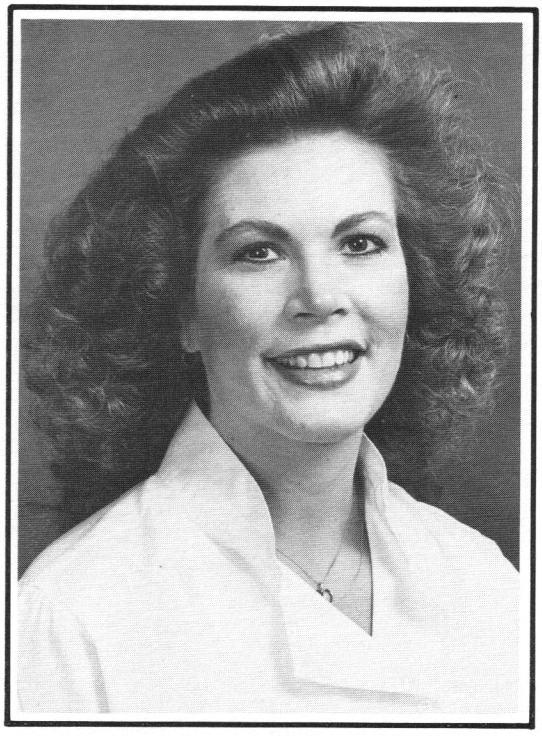


Figure 65 45° lighting plus fill light

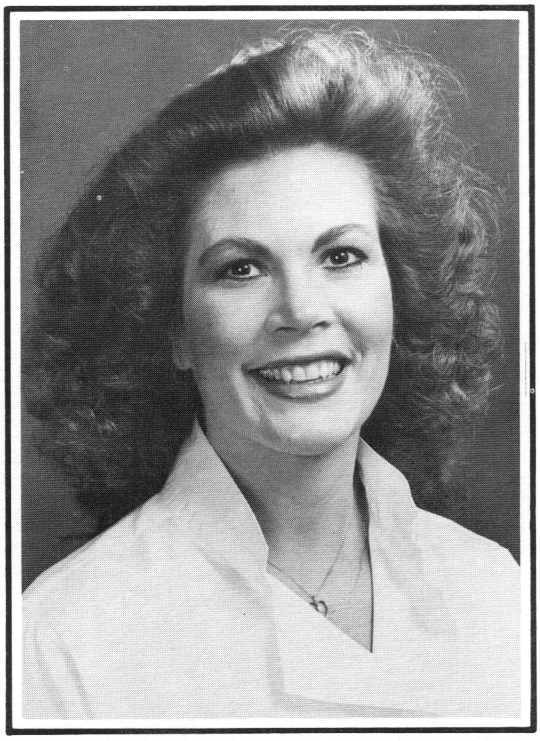


Figure 66 Results of adding the hair highlight

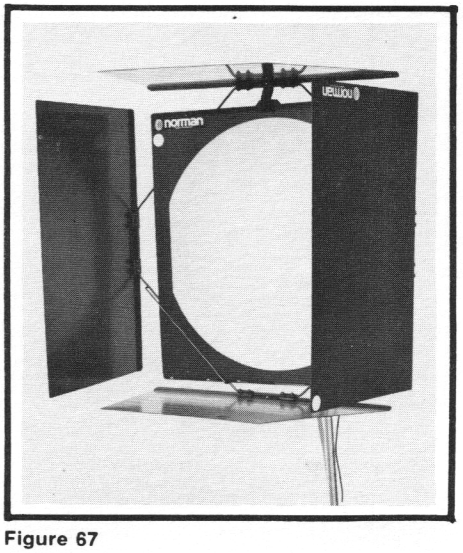


Figure 67

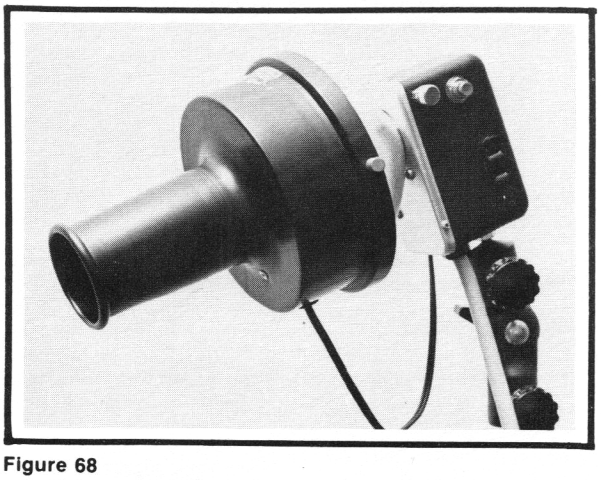


Figure 68

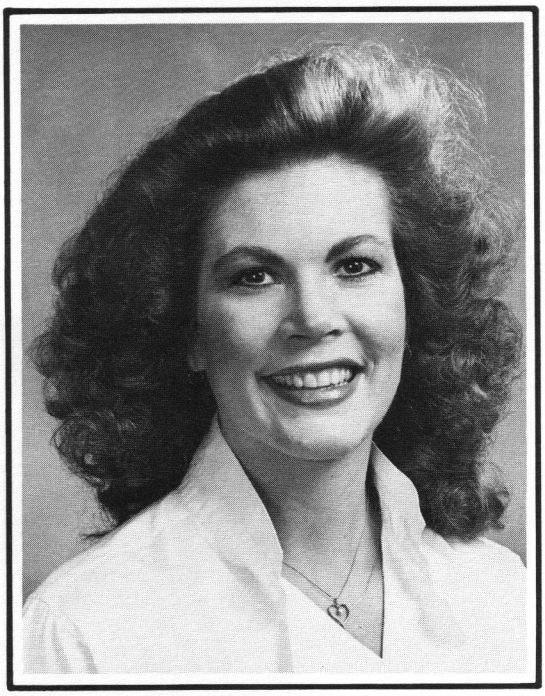


Figure 69 Results of adding the background light

A fourth light, the background light, provides some separation between the subject and the background, Fig. 69. Place the background light behind the subject as shown in Fig. 70. The subject now hides the background light from the camera.

The intensity of the background light depends on the background and on the effect you want. In general, the background light should never be so bright that it calls attention to itself. Also, if you're shooting B&W, you don't want the background to be the same brightness value as the subject's face. You may have to increase the intensity to make the background go lighter than the face (or move the background light closer to the backdrop). Or decrease the intensity to make the background go darker than the face.

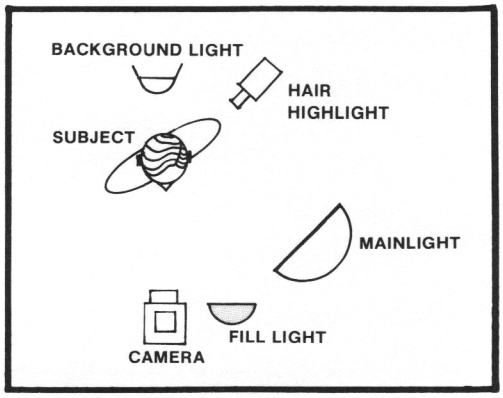


Figure 71

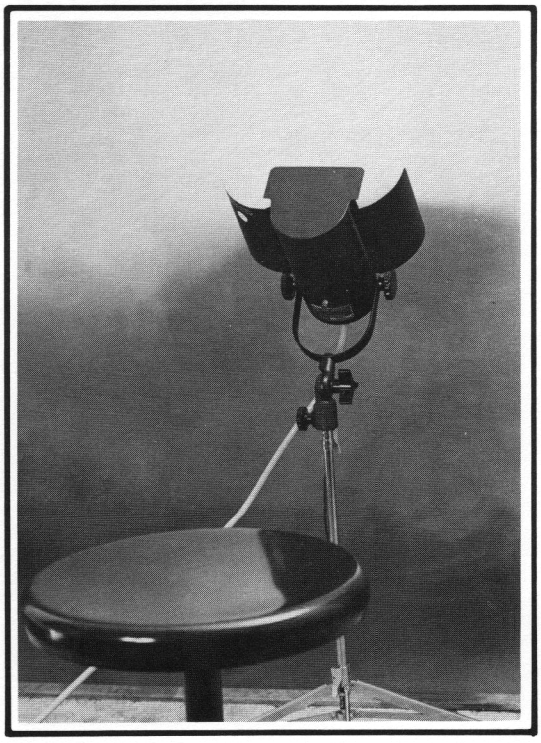


Figure 70

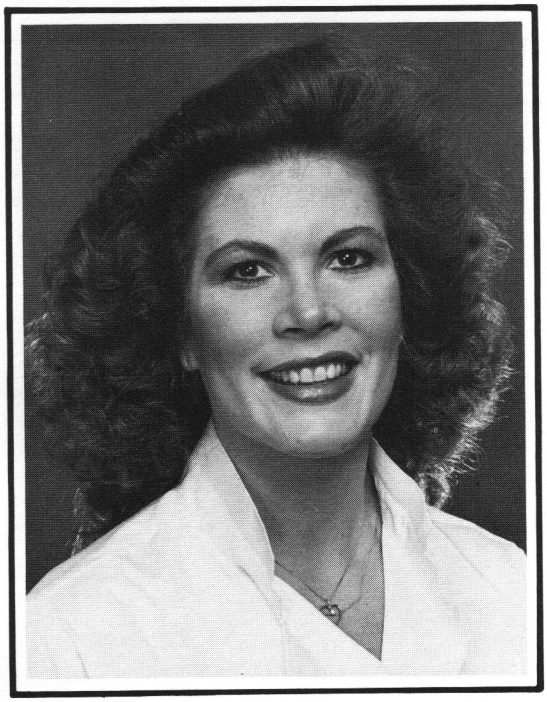


Figure 72 Rim lighting

Fig. 71 shows the traditional four-light setup for portraits. All four lights were used for Fig. 69. Fig. 72 shows a variation—rim lighting—which puts hair highlights around the edges of the subject's head. Here, we simply aimed the background light at the back of the subject's head. You've probably seen the effect exaggerated in many advertising portraits.

Fig. 73 shows another variation called "split lighting." The mainlight illuminates the subject from a 90° angle, Fig. 74. The fill light, in the normal position, lights the entire face. Split lighting gives a dimensional effect and provides strong hair highlights on one side of the head.

Using your lighting for a dimensional effect becomes especially important for profiles. Since a profile shows only one side of the face, it tends to lack dimension. However, by using shadows and highlights, you can give a profile a three-dimensional look.

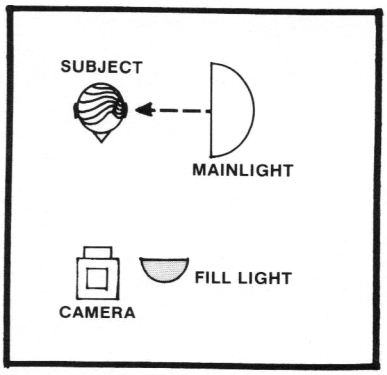


Figure 74

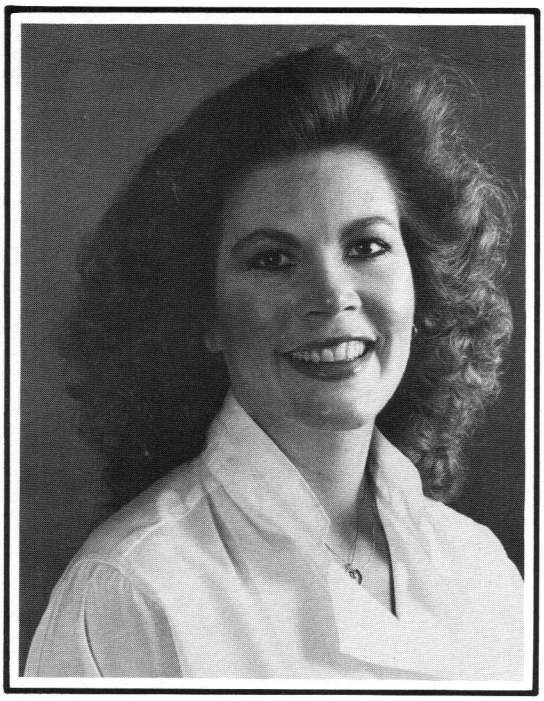


Figure 73

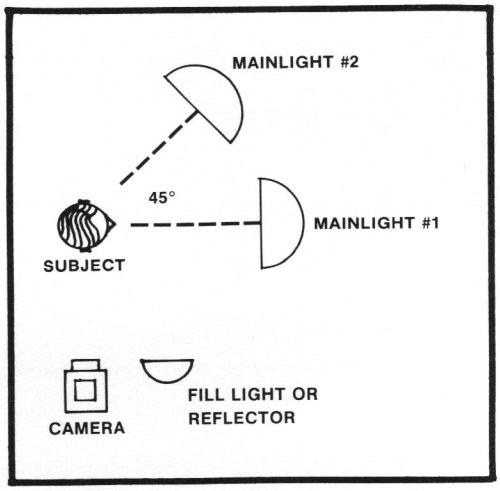


Figure 75

Fig. 75 shows the two favorite mainlight positions for profiles. Judge the height of the mainlight just as you would for any other portrait. With the mainlight in the #1 position, Fig. 75, you get the effect shown in Fig. 76. Placing the mainlight in the #2 position provides the effect shown in Fig. 77.

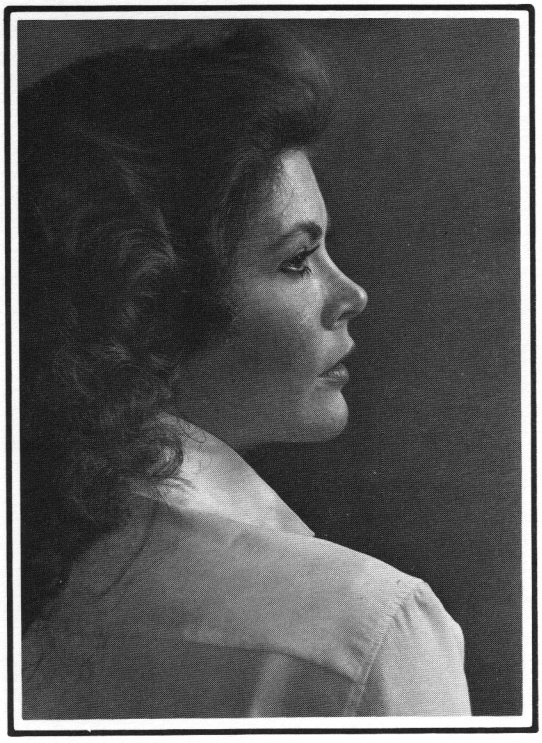


Figure 76

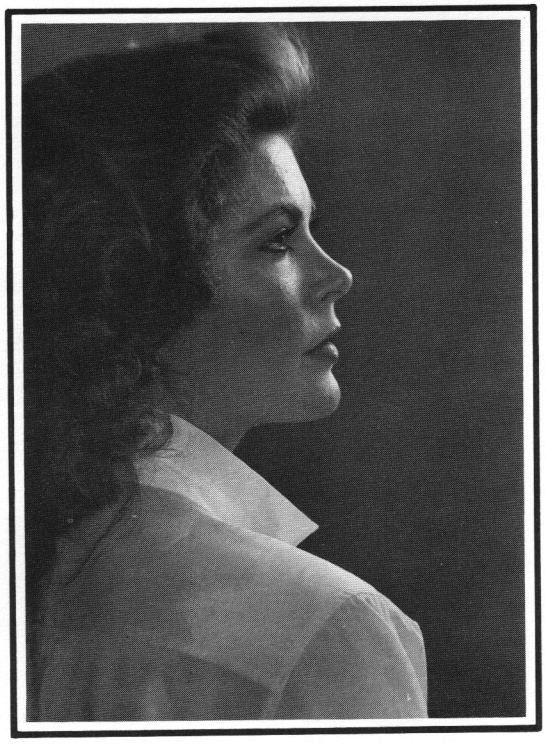


Figure 77

OUTDOOR LIGHTING FOR PORTRAITS

Outdoors, you can apply many of the same lighting techniques as used in the studio. Think of the sun as your mainlight. If you position your subject so that the sun illuminates the face at a 45° angle, you have classic portrait lighting.

However, outdoor lighting isn't always ideal for portraits. During much of the day, the sunlight may be too harsh. Harsh lighting produces dark shadows. Also, during the middle of the day, the sun is too high in the sky for proper portrait lighting. With the sun directly overhead, you may get shadows under your subject's eyes.

Early in the morning or late in the afternoon make the best daylight hours for portraits. Most photographers like to take their outdoor portraits around two hours before the sun sets. The sun then provides directional lighting at the proper height.

Fig. 78 shows a typical lighting setup. Here, the sunlight illuminates one side of the face; a reflector fills in the shadow side. Some photographers use a gold (rather than silver) umbrella to provide the fill. The gold reflector results in slightly warmer color tones.

Other photographers prefer to use a flash fill. As with studio setups, the fill flash should be at the camera position—around the same height as the lens. The flash then provides flat, nondirectional lighting.

Also, the flash fill should be weaker than the sunlight. Suppose that the outdoor lighting calls for f/11 at 1/250. Further, consider that the fill flash calls for an aperture of f/11. You then have a 1:1 lighting ratio—the fill light is as strong as the sunlight. The fill flash then eliminates any modeling, giving you a flat portrait.

You can cut down the light output of the flash by placing a white handkerchief over the unit. Or you can change your exposure settings to f/16 at 1/125. That's the same available-light exposure as before. But the f/stop causes the flash exposure to be one stop underexposed. You now have the traditional 3:1 lighting ratio.

If you're using an automatic flash unit. you can simply set the auto control for a one-stop or two-stop underexposure. For example, say that you're shooting at f/11. Set the flash for proper exposure at f/8 or f/5.6. You've just fooled the flash into thinking you're shooting at a larger aperture. And the flash cuts off early.

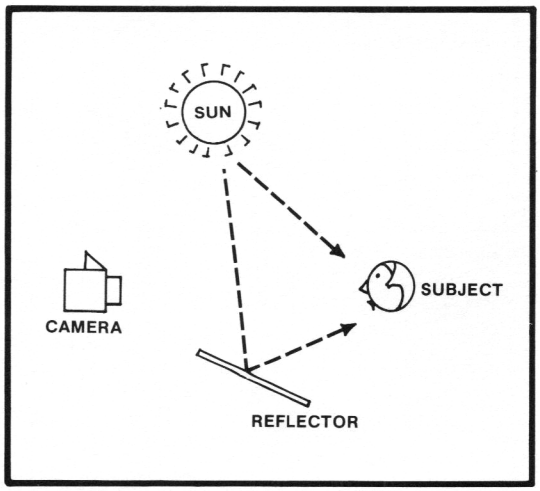


Figure 78

An overcast day also provides good portrait lighting. You may not even need the fill flash or the reflector. On an overcast day, the sky acts as a huge diffuser for the mainlight. You then get very soft, even lighting.

On an overcast day, you can place your subject in any position—the lighting remains the same. But the nondirectional lighting from an overcast day may eliminate all facial modeling.

You could still get modeling by adding light with a flash. However, most photographers subtract—rather than add—the light. Subtractive lighting uses a type of umbrella. Rather than having a silver reflecting surface, though, the umbrella is completely black.

Fig. 79 shows one setup. The black cloth or black umbrella holds back light from one side of the face—that side becomes the shadow side. You can also use subtractive lighting to eliminate shadows under the eyes (the shadows that result from direct overhead lighting). Just have an assistant hold the black cloth over the subject's head, Fig. 80.

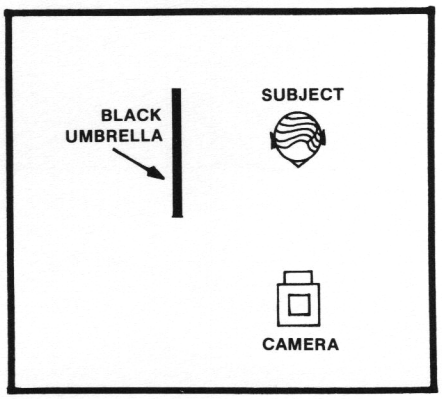


Figure 79

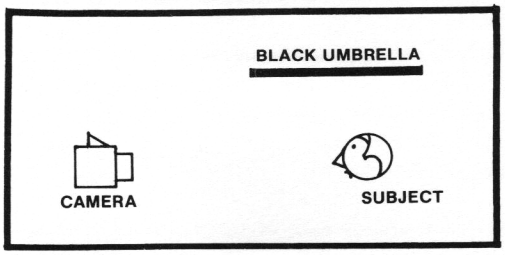


Figure 80

SUMMARY

In this assignment, we've tried to cover the basics in the most popular types of photography. The more you deal with the customer, the more important your photographic knowledge becomes. You'll then find that you're constantly getting questions regarding equipment and techniques.

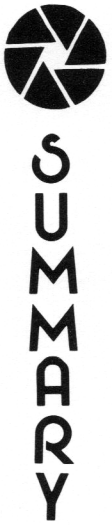
You may even find that customers prize your knowledge so much that you spend too much time trying to be a photographic counselor. Many shops have to isolate the camera-repair technicians from customers just to avoid losing camera-repair time.

Your personal interests in photography may take you much further than this lesson. There's a wealth of photographic information available. Different authors may give you completely contrasting opinions. And you have to make your own decision as to which author's technique you like the better.

It's also possible to learn by studying other pictures. Try to determine how the photographer handled the lighting. What techniques did the photographer use to accomplish the purpose of the picture? How could the picture have been improved?

Even if you don't deal with customers, you should develop sufficient capability to distinguish between camera error and photographer error. You'll learn more about specific customer problems as you continue through your course—particularly in your lessons on focal-plane shutters and flash synchronization. But, for your reference, here's a list of the most common user-caused photo problems:

1. Shooting on the wrong sync setting. Most people use electronic flash. Yet some cameras also have sync settings or separate sync terminals for flashbulbs. For proper sync with electronic flash, use the "X" setting. Using the "M" or "FP" setting results in no flash exposure to the film. Any image on the film depends on available light.
2. Shooting on too fast a shutter-speed setting with electronic flash and a focal-plane shutter. As you've seen, the focal-plane shutter cuts off part of the flash exposure at too fast a speed.
3. Subject blur from using too slow a shutter speed—or complete-picture blur from camera movement. If the subject moved during the exposure, the rest of the picture may be relatively sharp—only the moving subject appears blurred. But if the camera moved, the entire picture appears blurred. Generally, you shouldn't try to hand-hold the camera at a shutter speed slower than 1/30. Use a tripod or some other type of camera support.
4. Underexposure with electronic flash. People frequently expect too much out of their compact electronic-flash units. The small units may not be able to cover distances greater than 10 or 15 feet. Yet people will try to shoot flash pictures of the football field from the top seats in the stadium.
5. Burned up subject from standing too close with an electronic flash.
6. Reflections in windows, mirrors, or eyeglasses with electronic flash. With the flash at an angle to the reflective surface, you can usually avoid flash reflections.



7. Underexposure of the subject with an automatic camera. Quite often, a bright sky tricks the camera into setting too fast a shutter speed or too small an aperture for the subject. The sky seems properly exposed. But the foreground, including the subject, is too dark.
8. Shadows obscuring the subject's face in outdoor shots. The harsh light during the day throws dark shadows. A fill flash or a reflector can fill those shadow areas.
9. Reflections in store windows, partially obscuring the window display. A polarizing screen may offer the only solution here.
10. Lens flare outdoors. Shooting into the sun may cause light patterns on the film from flare. The pattern sometimes takes the shape of the lens diaphragm. Use a lens hood.
11. The subject has his eyes closed in all the flash shots. Closed eyes result from anticipation of the flash—not from the flash itself. You can often eliminate blinking by shooting fast—don't give the subject time to think about the flash. Or wait until the subject blinks and then shoot the picture. Most people won't blink quickly a second time.